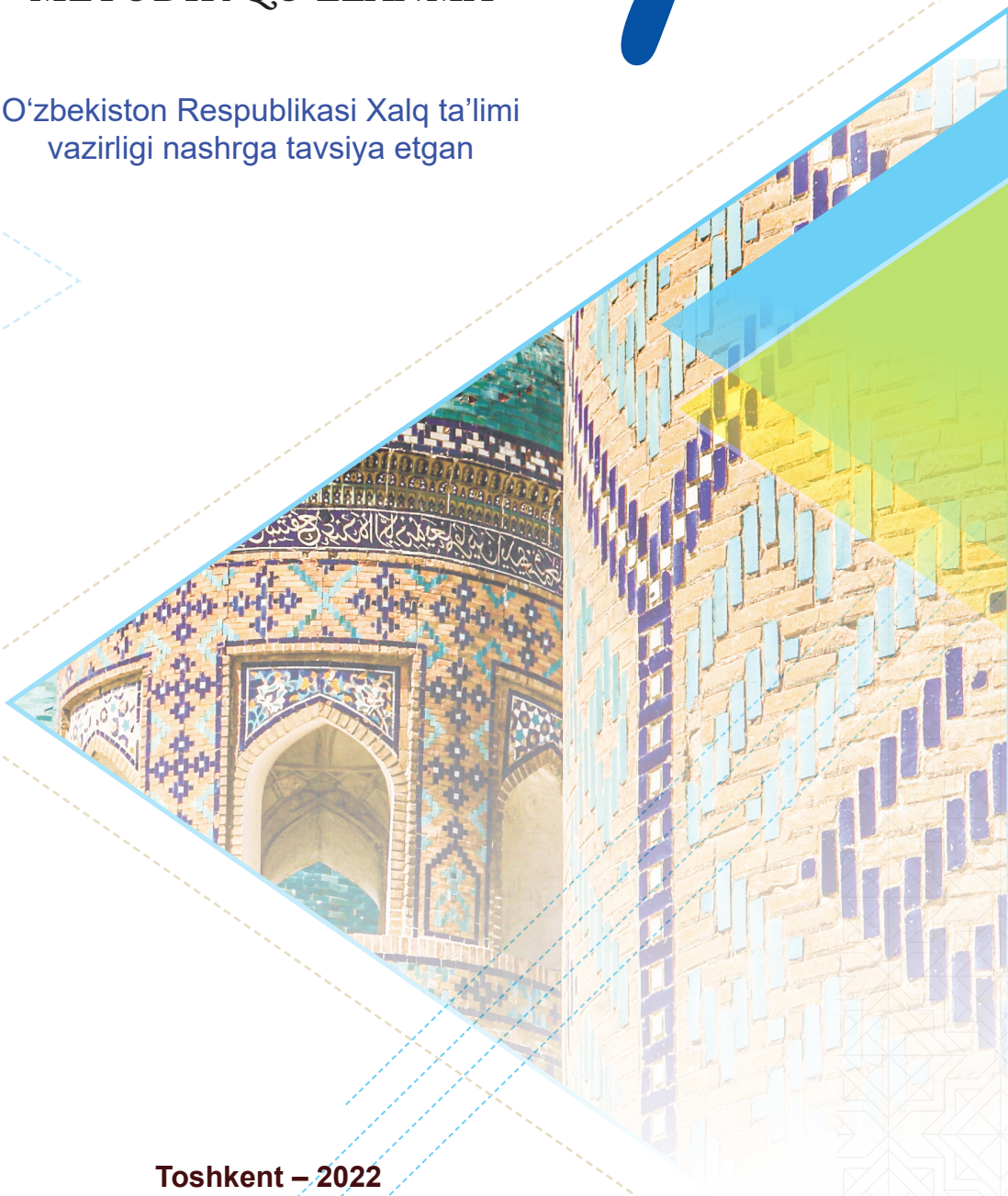
GEOMETRIYA

7

O‘QITUVCHILAR UCHUN
METODIK QO‘LLANMA

O‘zbekiston Respublikasi Xalq ta’limi
vazirligi nashrga tavsiya etgan



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Muhtaram ustozlar!

Respublikamizning yangi taraqqiyoti davrida malakali mutaxassislarga bo‘lgan ehtiyoj tobora ortib bormoqda. Hozirda vujudga kelgan iqtisodiy sharoit yangicha tafakkurga ega bo‘lgan, dunyoga yangicha ko‘z bilan qaraydigan, yangicha fikrlaydigan avlodning ishtirokini taqozo etmoqda. Bu qanchalik tez amalga oshirilsa, mamlakatimizning iqtisodiy salohiyati ham shunchalik tez yuksaladi. Bu o‘rinda yoshlarning matematik tayyorgarligiga qo‘yiladigan talablar ham juda muhim masala hisoblanadi.

Matematika fani bo‘yicha Milliy o‘quv dasturida belgilangan yangi davlat ta’lim standartlari va o‘quv dasturi geometriya ta’limini sifat va mazmun jihatidan yangi darajaga ko‘tarish vazifasini qo‘yadi. Bu – o‘z navbatida yangi O‘zbekiston kelajagini yaratuvchi barkamol avlodni, yangi zamon, yangi jamiyat kishisini tarbiyalashdek o‘ta mashaqqatli va ayni zamonda sharafli ish shu kunning eng muhim vazifalaridan biri bo‘lib qoldi. Uni amalga oshirish sizdek fidoyi o‘qituvchilar zimmasiga yuklanadi.

Shu vazifalarni amalga oshirish maqsadida 7-sinf “Geometriya” darsligi va o‘qituvchilar uchun mo‘ljallangan uslubiy qo‘llanma yaratildi. Darslikda keltirilgan mavzular sodda, tushunarli tilda, hayotiy masalalar yordamida qisqacha yoritilgan va rasmlar bilan bezatilgan. Mashg‘ulotlar har bir mavzu bo‘yicha turli xil kichik savollar, testlar, amaliy mashqlar, topshiriqlardan tashkil topgan bo‘lib, ular bir-biri bilan uzviy bogliq va o‘quvchidan ijodiy yondashuvni talab qiladi. Darslik asosida qay yo‘sinda dars olib borish yo‘l-yo‘riqlari uslubiy qo‘llanmada keltirilgan.

Darslikni yaratishda rivojlangan mamlakatlarda to‘plangan ilg‘or tajribalardan ham foydalanilgan. Shu bilan birga, darslikda yurtimizga xos sharqona umrboqiy qadriyatlarimizga katta e’tibor qaratilgan. Darslik o‘quvchining imkoniyatlarini, yoshini, individualligini, mustaqil fikrlovchi, o‘z qarash va tushunchalariga ega bo‘lgan erkin shaxs ekanligini hisobga olgan holda yozilgan. O‘qituvchi ushbu darslik asosida dars, mashg‘ulotlarda o‘quvchilarning faol ishtirokini ta’minlovchi, maxsus yo‘naltirilgan o‘quv uslublari (interfaol usuli)ni keng qo‘llashi, joriy qilishi mumkin. Mavzular hayot va turmush bilan bog‘liq holda konkret masalalar, amaliy topshiriqlar bilan to‘ldirilgan va o‘quvchilarning darsda va darsdan keyin ham o‘quv jarayonining faol ishtirokchisiga aylanishiga xizmat qiladi. O‘rni kelganda tarixiy ma’lumotlar ham keltirilib, o‘quvchilar bu fanning abstrakt, tushunarsiz, qiyin fan emasligini, balki u insonlarning ehtiyojlari, sivilizatsiyaning taraqqiyoti sababli paydo bo‘lgani va insoniyatga xizmat qilib kelayotgani, qolaversa, buyuk vatandoshlarimizning bu fan rivojiga qo‘shgan bebaho, ulkan hissalari to‘g‘risidagi zarur tushuncha va ma’lumotlarni bilib oladilar.

O‘quvchilarning yosh xususiyatlarini hisobga olib darslikda o‘quv materiali aksiomatik yondashuv bilan uyg‘unlashgan holda va shu bilan birga, o‘quvchiga buni qat’iy ta’kidlamasdan, imkon qadar sodda, tushunarli, yaqqollikka e’tiborni qaratgan holda berilgan. Jumladan, mavzularning ixcham holda berilishiga, iloji boricha kamroq so‘z ishlatishga, o‘quvchi uchun zarur bo‘lmagan yoki faqat o‘qituvchiga taalluqli bo‘lgan materiallarni darslikka kiritmaslikka harakat qilingan. Bunda, albatta, chizmalarning, rasmlarning roli juda muhimdir. Chizmalardan nafaqat masala yoki teoremaning shartini ifodalovchi rasm, illyustratsiya sifatida, balki geometrik intuitsiyani, tasavvurni rivojlantiruvchi, shakllantiruvchi vosita sifatida ham foydalanish mumkin. Qadimgi Hindistonda matematikaga oid ilmiy asarlar-

da teoremaning isbotida ko‘pincha chizma keltirilgan va yonida faqat «Qara!» degan yozuv bo‘lgan. Teoremaning yoki masalaning butun mazmuni va mohiyati shu chizmada o‘z aksini topgan.

Darslik bilan ishlashda, umuman, geometriyani o‘rganishda masalalarni yechish juda muhim rol o‘ynaydi. Darslikda ham, mazkur qo‘llanmada ham eng asosiy e’tibor shunga qaratilgan. Yangi tushunchalar, shakllar, ularning xossalari, oldindan tanish bo‘lgan tushunchalar, faktlarning yangicha talqini, kengaytirilishi, yuritilgan mulohazalarning mohiyati masalalar yechish mobaynida puxta o‘zlashtirilishi mumkin.

O‘qituvchilar uchun uslubiy qo‘llanmada yangi davlat ta’lim standartlari talablaridan kelib chiqqan holda, darslik asosida o‘qitish bo‘yicha metodik ko‘rsatmalar, har bir mavzu bo‘yicha dars ishlanmalari, ba’zi masalalarning yechimlari va ko‘rsatmalar, mavzularni mustahkamlash uchun qo‘shimcha masalalar va ularning yechimlari berilgan. Bundan tashqari, darslik bo‘yicha tuzilgan yillik mavzuviy rejalashtirish, oraliq nazoratlar uchun yozma ish variantlari, har yarim yillikka mo‘ljallangan test topshiriqlari, sinfdan tashqari ishlash uchun materiallar berilgan.

Mazkur qo‘llanma geometriya fani bo‘yicha dars olib borayotgan barcha maktab o‘qituvchilari va uni o‘qitish uslubiyati masalalari bilan shug‘ullanayotgan mutaxassislarga mo‘ljallangan bo‘lib, unda keltirilgan tavsiyalar bu fanni o‘qitishni takomillashtirishda yordam beradi, degan umiddamiz.

Mualliflar

Matematika fanidan milliy o‘quv dasturining maqsadlari

Matematika fanini o‘qitishdan ko‘zlangan maqsad quyidagilardan iborat:

– o‘quvchilar tomonidan matematik tushunchalar, xossalar, geometrik shakllar, usullar va algoritmlar haqidagi bilim, ko‘nikmalar egallanishini ta’minlash;

– inson kamoloti va jamiyat taraqqiyotida matematikaning ahamiyatini anglatish, ijtimoiy-iqtisodiy munosabatlar, kundalik hayotda matematik bilim va ko‘nikmalarni muvaffaqiyatli qo‘llashga o‘rgatish;

– o‘quvchilarning individual xususiyatlarini rivojlantirgan holda, mustaqil ta’lim olish, kreativ, tanqidiy fikrlash va mantiqiy tahlil, qiziquvchanlik, muammolarni hal qilish, yangiliklar yaratishga bo‘lgan ko‘nikmalarini namoyon qilish va rivojlantirish;

– fanlar integratsiyasini inobatga olgan holda o‘quvchilarda milliy va umuminsoniy qadriyatlarni shakllantirish hamda ularni ongli ravishda kasb tanlashga yo‘naltirish;

– kelgusida matematikadan bilim va ko‘nikmalar talab qilinadigan boshqa fanlarni o‘rganish uchun zarur bo‘lgan matematik mazmunni shakllantirish va rivojlantirish.

Matematika fanidan o‘quvchilarda rivojlantiriladigan tayanch kompetensiyalar

Umumiy o‘rta ta’lim tizimida o‘quvchilarda fanga oid kompetensiyalar bilan birgalikda tayanch kompetensiyalar shakllantirilishi belgilab berilgan. Turli fanlarni o‘rganish orqali o‘quvchilarda tayanch kompetensiyalarni shakllantirish - o‘zlashtirgan bilim va ko‘nikmalarini turli hayotiy vaziyatlarda qo‘llay olishga qaratilishi maqsadga muvofiq.

Kommunikativ kompetensiya

Kommunikativ kompetensiyalarni shakllantirishda davlat tili, xorijiy tillarni o‘zlashtirishda mustaqil, ijodiy fikrlash, yozma va og‘zaki ravon bayon etish, to‘g‘ri talaffuz qilish, izohlab berish hamda erkin muloqot qilishga o‘rgatish zarur. Xususan, matematika fanining o‘z ilmiy tili, o‘z tushunchalari, belgi va timsollari ham mavjud bo‘lib, bu tilda muloqot qilishga kommunikativ kompetensiyalarni shakllantirish omili sifatida qaralishi lozim.

Axborot bilan ishlash kompetensiyasi

Fanlarni o‘qitishda axborot bilan ishlash kompetensiyasini samarali rivojlantirish imkoniyatlarini kengaytiruvchi zamonaviy axborot-telekommunikatsiya vositalaridan muntazam foydalanish zarur. Bunda o‘quvchilarni darslik, elektron resurslar va turli o‘quv manbalari bilan ishlash, matematika faniga oid axborotlarni turli manbalardan izlash, tahlil qilish va axborot xavfsizligiga rioya qilgan holda axborot vositalari bilan ishlash ko‘nikmalarini shakllantirishda turli amaliy dasturiy paket va ta’minotlardan, mobil qurilma (telefon, planshet va boshqa gadjet)lardan foydalanish tavsiya etiladi.

O‘z-o‘zini rivojlantirish kompetensiyasi

O‘z-o‘zini rivojlantirish kompetensiyasini shakllantirishda umuminsoniy qadriyatlar asosiga qurilgan fazilatlarga ega bo‘lish, Vatanni sevish, jamiyat va tabiat haqidagi bilimlarga ega bo‘lish, yangiliklarga intilish va o‘zlashtirgan nazariy bilimlari asosida mustaqil qaror qabul qilish, jamiyatda ro‘y berayotgan progressiv va innovatsion o‘zgarishlardan xabardor va ularga daxldor bo‘lish, doimo zamonaviy bilim va ko‘nikmalarni egallashga intilish hamda ulardan kundalik hayotda foydalana olishga o‘rgatish zarur. Shu o‘rinda matematika fanini puxta o‘rganish orqali o‘quvchilar tartib-intizomga o‘rganadilar, har bir muammoga matematik masala sifatida qarab, uni yechishda qat’iyatli bo‘ladilar.

Ijtimoiy-emotsional va fuqarolik kompetensiyasi

Ijtimoiy-emotsional va fuqarolik kompetensiyasini shakllantirishda fuqarolik burch, ijtimoiy va siyosiy rivojlanish, favqulodda vaziyatlar, ekologik muammolar haqida bilimlarga ega bo‘lish hamda badiiy va san’at asarlarini tushunish hamda ularni asrashda tashkilotchilik xislatlarini rivojlantirishdan iborat. Shuningdek, matematika ularni haqqo‘y, nohaqlikka befarq bo‘lmaslik va vatanga sadoqatli bo‘lish ruhida tarbiyalaydi. Matematika fanini puxta o‘rgatish orqali o‘quvchilarni jamiyatning faol fuqarosi sifatida rivojlantirib borishga zamin yaratiladi.

Matematika fani bo‘yicha “Al-jabr” ta’lim standartlari (bitiruvchilarning o‘zlashtirgan bilim va ko‘nikmalariga qo‘yilgan talablar)

Matematika fani bo‘yicha ta’lim standartlari umumta’lim maktablari (11-sinf) bitiruvchilarining fan bo‘yicha bilim, ko‘nikma va kompetensiyalariga qo‘yilgan umumlashgan talablardan iborat bo‘lib, ular matematik mazmun va amaliy faoliyat standartlariga bo‘linadi.

Matematik mazmun standartlari (bilim va ko‘nikmalar) – *asosiy matematik tushunchalar va munosabatlar mohiyatini tushunish va ulardan tipik o‘quv topshiriqlarini bajarishda foydalanish.*

Ushbu standartlar o‘quvchilarga matematikani o‘rganish orqali nimani tushunishi va nimalarni bajarishga qodir bo‘lish kerakligini belgilab beradi. Matematikada tushunishning o‘ziga xos belgilaridan biri bu – o‘quvchining matematik o‘zlashtirish darajasidan kelib chiqqan holda muayyan matematik ifodaning to‘g‘ri yoki noto‘g‘ri ekani yoki muayyan matematik qoidaning qayerdan kelib chiqishini asoslab berish qobiliyatidir. Matematik tushuncha mohiyatini tushunish va tipik amallarni bajarish ko‘nikmasi birdek muhim bo‘lib, ular muayyan murakkablik darajasidagi standart topshiriqlar yordamida baholanadi.

Matematik mazmun standartlari umumlashgan talablar ko‘rinishida ifodalanib, ular matematikaning quyidagi mazmun sohalari va bo‘limlarini qamrab oladi (kelgusida ishlatish qulay bo‘lsin uchun mazmun sohalari va bo‘limlar nomi bosh harfi bilan kodlanadi):

– sonlar va amallar (SA);

– algebra va funksiyalar (AF):

– geometriya va o‘lchashlar (GO‘);

– statistika va ehtimollik (SE);

– matematik analiz (MA).

Mazmun sohasi	Mazmun sohasi bo‘limlari	Bo‘lim bo‘yicha standartning qisqacha tavsifi va kodi
Sonlar va amallar (SA)	Son tushunchasi	Sonlar va miqdorlar (kattaliklar) haqida tushunchaga ega bo‘lish, ularni tasvirlash usullarini va sanoq sistemalarini bilish (SA.ST)
	Amallar va hisoblashlar	Matematik amallar mohiyatini bilish, sonlar va kattaliklar o‘rtasida munosabatlarni o‘rnatish va tushunish hamda masalalarni yechishda qo‘llash. Sonlar va kattaliklar ustida hisoblashlarni qiyinchiliklarsiz bajarish, natijaga tegishli baho berish va ularni chamalash va yaxlitlash (SA.AH)
Algebra va funksiyalar (AF)	Algebraik ifodalar va almashtirishlar	Matematik belgi va timsollar yordamida hayotiy vaziyatlar va tabiatdagi hodisalarni, miqdoriy munosabatlarni matematik tilda ifodalash, tushunish va tahlil qilish, asosiy algebraik almashtirishlarni bilish va ulardan masalalar yechishda foydalanish (AF.AA)
	Munosabatlar va funksiyalar	Tabiat va jamiyatdagi qonuniyatlar, munosabatlar mohiyatini funksiya sifatida tushunish, bu jarayonlardagi o‘zgaruvchilar orasidagi munosabatlarni matematik nuqtayi nazardan talqin qilish (AF.MF);
	Tenglama va tengsizliklar	Chiziqli, kvadratik, ratsional, irratsional, ko‘rsatkichli (eksponensial), logarifmik, darajali va trigonometrik tenglamalar, tengsizliklar va ularning sistemalarini yechishda standart yechish metodlarini qo‘llay olish hamda yechimlarni ko‘rgazmali ifodalash (AF.TT)
Geometriya va o‘lchashlar (GO‘)	Geometrik shakllar	Yassi va fazoviy geometrik shakllarni chizma, model va real voqelikda taniy olish, ularning asosiy xossalarini bilish (GO‘.GSh)
	Geometrik mushohada va masala yechish	Geometrik shakllarning xossalari haqida geometrik va mantiqiy fikrni rivojlantirish, geometrik isbot qilish metodlari va masalalarni yechish algoritmlaridan foydalanish, asosli matematik mulohazalar yuritish (GO‘.MM)
	Geometrik mushohada va masala yechish	Geometrik shakllarning xossalari haqida geometrik va mantiqiy fikrni rivojlantirish, geometrik isbot qilish metodlari va masalalarni yechish algoritmlaridan foydalanish, asosli matematik mulohazalar yuritish (GO‘.MM)

	Geometrik yasashlar	Koordinatalar sistemasi va boshqa tasvirlash tizimlarida geometrik munosabatlarni tasvirlash va ularning geometrik o‘rnini aniqlash, sodda geometrik yasashlarni amalga oshirish, simmetriya va geometrik shakl almashtirishlardan foydalanish (GO‘.GY)
	O‘lchashlar va o‘lchash usullari	Turli obyektlarning o‘lchanadigan elementlarini, o‘lchov birliklarini bilish, o‘lchov tizimlari va jarayonlarining mohiyatini tushunish, o‘lchash jarayonida mos o‘lchov usullari, formulalar, o‘quv qurollari, multimediali interaktiv ilovalar, kalkulyator va o‘lchov asboblaridan foydalanish (GO‘.O‘U)
Statistika va ehtimollik (SE)	To‘plamlar va mantiq elementlari	To‘plamlar ustida amallar mohiyatini bilish va ularni bajara olish, sodda mantiqiy xulosalarni chiqara olish (SE.TM)
	Ma’lumotlarni statistik tahlil qilish	Kerakli ma’lumotlarni topish, aniqlash, yig‘ish va ularga ishlov berish hamda natijalarni talqin qilish va turli vositalar yordamida taqdim qilish; ma’lumotlarni tahlil qilish uchun mos statistik ishlov berish usullarini tanlash va qo‘llash, ma’lumotlar asosida tegishli xulosa qilish va bashoratlarni ishlab chiqish va ularni baholash (SE.ST)
	Kombinatorika asoslari	Kombinatorika masalalari mohiyatini tushunish va ularni yechish algoritmidan hayotiy masalalarni yechishda foydalanish (SE.KA)
	Ehtimolliklar nazariyasi asoslari	Tasodifiy, statistik hodisa va jarayonlar haqida tasavvurga ega bo‘lish, ularni tadqiq qilish, ehtimollik modellarini ishlab chiqish, ularni talqin qilish, baholash va ulardan foydalanish (SE.EN)
Matematik analiz (MA)	Funksiya va uning tatbiqlari	Funksiyaga oid asosiy tushunchalarni, uning umumiy xossalari va turlarini bilish, aniqlay olish, shuningdek, asosiy elementar funksiyalarni taniy olish, ularning asosiy xossalarini bilish, ularni tenglama va tengsizliklarni hamda amaliy masalalarni yechishda qo‘llay olish (MA.FT)
	Hosila va uning tatbiqlari	Funksiyaning uzluksizligi va hosilasi tushunchalarining mohiyatini bilish, hosilaning geometrik va fizik ma’nolarini tushunish hamda funksiyalarni hosila yordamida tekshirish algoritmini bilish, ularni funksiyalarning xossalarini aniqlashda, shuningdek, amaliy, ekstremumga doir masalalarni yechishda qo‘llay olish (MA.HT)

	Boshlang‘ich funksiya, aniq integral va uning tatbiqlari	Boshlang‘ich funksiya va aniq integral tushunchalarning mohiyatini bilish va ulardan turli amaliy (yuz va hajmlarni hisoblash va bajarilgan ishni topish) masalalarni yechishda foydalana olish (MA.IT)

Amaliy faoliyat standartlari (kompetensiyalar) – o‘zlashtirilgan bilim va ko‘nikmalarini amaliy masalalarni yechishda va notanish vaziyatlarda qo‘llay olish.

Mazkur standartlar ham umumlashgan mazmunda bo‘lib, ular o‘quvchilarning quyidagi amaliy faoliyati sohalarini qamrab oladi (kelgusida ishlatish qulay bo‘lsin uchun bu sohalar mos harflar bilan kodlanadi):

– mulohaza yuritish (MY);

– matematik modellashtirish (MM);

– muammoni hal qilish (MH);

– muloqot qilish (MQ).

Amaliy faoliyat turi	Amaliy faoliyatning qisqacha tavsifi	Amaliy faoliyat standartining qisqacha tavsifi va kodi
Mulohaza yuritish (MY)	Matematikaga oid fikrni asoslash, isbotlash yoki o‘zgalar fikriga munosabat bildirish uchun mantiqan asosli va tushunarli dalillarni keltirish	Aqliy faoliyatga asoslangan mantiqiy fikrlash, taxmin qilish, xulosa chiqarish, dalillar keltirish, asoslash, xulosalash, asoslov va sabablar ustida fikrlash (MY.AF);
		Qo‘llanadigan ta’riflar, qoidalar, tushunchalar, algoritm va usullar, matematik yechimlar va xatolar ustida fikr yuritish (MY.AU);
		Matematik tushunchalar orasidagi aloqalarni tanish va ulardan foydalanish (MY.AT)
		Yaxlit matematik tushunchani hosil qilish uchun matematik tushunchalarni birlashtirish yoki birini ikkinchisining ustiga qurish (MY.TB)

Matematik modellashti-rish (MM)	O‘quv va hayotiy muammolarni matematika tilida ifodalash, ularning matematik modelini qurish;	Muammoli vaziyatlar mohiyatini o‘qib tushunish, tahlil qilish va unda keltirilgan muammoni aniqlash (MM.VT)
		Tabiat, jamiyatdagi hodisa va jarayonlarni tushuntirish va modellashtirish uchun turli matematik talqin usullaridan foydalanish (MM.MT)
		Muammoni matematik masala ko‘rinishida ifodalash, matematik modelini tuzish (MM.MT)
Muammoni hal qilish (MH)	Matemati-kani qo‘llab muammoni hal qilish	Hayotiy muammo va amaliy matematik masalalarni yechish uchun o‘rganilgan matematik tushunchalar, faktlar, g‘oyalar, qonuniyatlar, algoritmlar va metod-lardan foydalanish (MH.MF)
		Muammo (masala)ni yechishda mantiqiy, kreativ fikrlash, matematik mushohada yuritish va ilmiy izlanish usullari: kuzatish, o‘lchash, tajriba o‘tkazish, analiz va sintez, induksiya va deduksiya, taqqoslash va analogiyalardan foydalanish (MH.MY)
		Muammo (masala)ni yechishning muqobil usullari va algoritmlarini tahlil qilish, tanlash va asoslash (MH.MU)
		Muammo (masala)ni yechish jarayonida yangi matematik bilimlarni hosil qilish va ularni o‘zlashtirish (MH.BO‘)
		Matematik taxminlarni ifodalash va tadqiq qilish, matematik asoslash, taqqoslash va baholash (MH.TT)
		Matematik yechimni real muammo mazmuniga ko‘chirish va matematik masalada tasvirlangan real muammoga nisbatan uni talqin qilish va topilgan yechimning muammoning haqiqiy yechimiga mos-ligini, yaqinligini baholash (MH.TB)
		Muammoni hal qilish algoritmlarini hayotiy vaziyatlar asosiga qurilgan kichik tadqiqot, loyiha ishini baja-rish jarayonida namoyish qilish va taqdimot qilishda AKT imkoniyatlaridan foydalanish (MH.TQ)

Muloqot qilish (MQ)	Matematik tushuncha, belgi va timsollar asosida matematika tilida o‘zaro muloqot qilish	Matematik fikrni og‘zaki va yozma yetkazish, o‘zgalar bilan o‘zaro muloqot qilish uchun matematika tilidan, belgi va timsollardan o‘rnida foydalanish (MQ.BT)
		Boshqalarning matematikaga oid fikrlarini tushunish, tahlil qilish, baholash va ularga munosabat bildirish (MQ.TB)

Matematika fanidan amaliy faoliyat standartlari har bir sinf kesimida mazmun standartlari bilan uzviy bog‘liq bo‘lib, tegishli mazmun standartlarida o‘z aksini topgan. Amaliy faoliyat standartlari mazmun standartlarining mazmuniga mos bo‘lgan, tegishli yosh fiziologik imkoniyatlari, aqliy va amaliy faoliyat sohalaridan kelib chiqib singdirilgan.

7–SINF UCHUN GEOMETRIYA FANIDAN STANDARTLARNING ANIQLASHTIRILGAN ELEMENTLARI

Maz-mun sohasi	Maz-mun sohasi bo‘limi	Standartning qisqacha tavsifi va kodi	Standartning aniqlashtirilgan elementlari va kodi
	Geometrik shakllar	Yassi va fazoviy geometrik shakllarni chizma, model va real voqelikda taniy olish, ularning asosiy xossalarini bilish (GO‘.GSh);	M7.GO‘.GSH.01. Geometriya fanining vujudga kelish tarixini biladi va fanning maqsad va vazifalarini tushunadi, tegishli misollar keltira oladi. M7.GO‘.GSH.02. Geometriyaning boshlang‘ich tushunchalari mohiyatini tushunadi, eng sodda shakllarni biladi, ularning asosiy xossalarini tushunadi, tegishli misollar keltira oladi. M7.GO‘.GSH.03. Kesma va nurni ta’riflay oladi, ularning asosiy elementlarini va xossalarini biladi; M7.GO‘.GSH.04. Aylana va doirani ta’riflaydi. ularning elementlarini biladi va o‘zaro farqlaydi. M7.GO‘.GSH.05. Burchak va uning elementlarini biladi, burchakning tashqi va ichki sohalarini farqlay oladi. M7.GO‘.GSH.06. Burchaklarning turlarini biladi, burchak bissektrisasini ta’riflaydi. M7.GO‘.GSH.07. Qo‘shni va vertikal burchaklarni ta’riflay oladi va ularning xossalarini biladi va isbotlay oladi. M7.GO‘.GSH.08. Perpendikulyar to‘g‘ri chiziqlarni tasavvur qila oladi va tasvirlay oladi. M7.GO‘.GSH.09. Siniq chiziq, yopiq siniq chiziq, ko‘pburchak, botiq va qavariq ko‘burchak, ko‘pburchak elementlarini ta’riflaydi. M7.GO‘.GSH.10. Uchburchakni ta’riflay oladi, uning elementlarini, medianasi, bissektrisasi va balandligi tushunchalarini ta’riflab, chizmada tasvirlaydi.
			M7.GO‘.GSH.11. Uchburchakni tomonlari va burchaklariga ko‘ra turlarini aytib bera oladi, M7.GO‘.GSH.12. To‘g‘ri chiziqlarning parallelligi tushunchasi mohiyatini tushunadi va chizmada tasvirlay oladi; M7.GO‘.GSH.13. Ikki to‘g‘ri chiziq va kesuvchi hosil qilgan burchaklarni tasniflaydi; M7.GO‘.GSH.14. Ikki parallel to‘g‘ri chiziqlar va kesuvchi hosil qilgan burchaklarni farqlay oladi;

			M7.GO‘.GSH.15. Uchburchakning tomonlari va burchaklarini taqqoslay oladi (katta tomon qarshisida katta burchak yotadi va aksincha…).
	Geometrik mushohada va masala yechish	Geometrik shakllarning xossalari haqida geometrik va mantiqiy fikrni rivojlantirish, geometrik isbot qilish metodlari va masalalarni yechish algoritmlaridan foydalanish, asosli matematik mulohazalar yuritish (GO‘.MM);	M7.GO‘.MM.01. Perpendikulyar va og‘mani tasavvur qila oladi va nuqtadan to‘g‘ri chiziqqacha bo‘lgan masofani topa oladi. M7.GO‘.MM.02. Siniq chiziqning elementlarini biladi, uzunligini hisoblaydi; M7.GO‘.MM.03. Ko‘pburchakning perimetrini topa oladi. M7.GO‘.MM.04. Teng yonli uchburchak bissektrisasi haqidagi teoremani biladi va qo‘llay oladi; M7.GO‘.MM.05. Uchburchaklar tengligining 1-alomatini tushunadi, alomatga ko‘ra teng uchburchaklarni aniqlay oladi va teoremalarni isbot qilishda va masalalar yechishda qo‘llay oladi. M7.GO‘.MM.06. Teng yonli uchburchak, uning elementlarini biladi, xossalarini masalalar yechishda qo‘llay oladi. M7.GO‘.MM.07. Uchburchaklar tengligining 2-alomatini tushunadi, alomatga ko‘ra teng uchburchaklarni aniqlay oladi va masalalar yechishda qo‘llay oladi. M7.GO‘.MM.08. Uchburchaklar tengligining 3-alomatini tushunadi, alomatga ko‘ra teng uchburchaklarni aniqlay oladi va masalalar yechishda qo‘llay oladi. M7.GO‘.MM.09. Uchburchaklar tengligi alomatlarini qo‘llagan holda hisoblashga oid masalalarni yecha oladi. M7.GO‘.MM.10. Kesmaning o‘rta perpendikulyari xossasini biladi va uni qo‘llay oladi. M7.GO‘.MM.11. To‘g‘ri chiziqlarning parallelligi va perpendikulyarligi haqidagi teoremalarni biladi va ulardan teoremelarni isbot qilish va masalalar yechishda foydalana oladi. M7.GO‘.MM.12. Parallel to‘g‘ri chiziqlarga doir masalalarni yecha oladi. M7.GO‘.MM.13. Ikki to‘g‘ri chiziqning parallellik alomatlari haqidagi teorema va uning natijalarini biladi va ulardan masalalar yechishda foydalana oladi. M7.GO‘.MM.14. Uchburchak ichki burchaklari yig‘indisi haqidagi teoremani va uning natijalarini isbotlay oladi.

			M7.GO‘.MM.15. Uchburchakning ichki va tashqi burchagi haqidagi teoremalardan masalalar yechishda foydalana oladi. M7.GO‘.MM.16. To‘g‘ri burchakli uchburchak elementlari va uning xossalarini biladi va ulardan tegishli vaziyatlarda foydalana oladi. M7.GO‘.MM.17. To‘g‘ri burchakli uchburchaklarning tenglik alomatlari haqidagi teoremalarni biladi va masalalar yechishda foydalana oladi. M7.GO‘.MM.18. To‘g‘ri burchakli uchburchak gipotenuzasiga tushirilgan medianasi xossasini biladi va undan masalalar yechishda foydalana oladi. M7.GO‘.MM.19. Burchak bissektrisasining xossasini biladi, undan masalalar yechishda foydalana oladi; M7.GO‘.MM.20. Uchburchakning tomonlari va burchaklari orasidagi munosabatlar haqidagi teoremalarni biladi va undan masalalar yechishda foydalana oladi. M7.GO‘.MM.21. Uchburchak tengsizligi haqidagi teoremani biladi va undan masalalar yechishda foydalana oladi; M7.GO‘.MM.22. Isbotlashga oid masalalar mohiyatini biladi va sodda hollarda ularni isbotlay oladi. M7.GO‘.MM.23. Geometrik mushohada yurita oladi va amaliy masalalarni yecha oladi.
	Geometrik yasashlar va munosabatlarni tasvirlash	Koordinatalar sistemasi va boshqa tasvirlash tizimlarida geometrik munosabatlarni tasvirlash va ularning geometrik o‘rnini aniqlash, sodda geometrik yasashlarni amalga oshirish,	M7.GO‘.YM.01. Kesmalarni sirkul yordamida taqqoslay oladi, uzunligini chizg‘ich bilan o‘lchaydi va ular ustida amallar bajara oladi. M7.GO‘.YM.02. Transportir yordamida burchakni yasay oladi. M7.GO‘.YM.03. Burchak bissektrisasini yasay oladi. M7.GO‘.YM.04. To‘g‘ri chiziqqa perpendikulyar o‘tkazish algoritmini biladi va o‘tkaza oladi. M7.GO‘.YM.05. Kesmani teng ikkiga bo‘lish algoritmini biladi va shu asosda kesmani teng ikkiga bo‘la oladi. M7.GO‘.YM.06. Sirkul va oddiy chizg‘ich yordamida berilgan burchakka teng burchakni yasay oladi.

		simmetriya va geometrik shakl almashtirish-lardan foydalanish (GO‘.YM);	
	O‘lchashlar va o‘lchash usullari	Turli obyektlarning o‘lchanadigan elementlarini, o‘lchov birliklarini bilish, o‘lchov tizimlari va jarayonlarining mohiyatini tushunish; o‘lchash jarayonida mos o‘lchov usullari, formulalar, o‘quv qurollari, kalkulyator va o‘lchov asboblaridan foydalanish (GO‘.O‘U).	M7.GO‘.O‘U.01. Uzunlik o‘lchov birliklarini biladi va ikki nuqta orasidagi masofani aniqlay oladi; M7.GO‘.O‘U.02. Burchak o‘lchov birliklarini biladi va transportir yordamida burchakni o‘lchaydi va taqqoslay oladi;

GEOMETRIYA FANIDAN 7–SINF UCHUN O‘QUV DASTURI VA TAVSIYAVIY SOATLAR TAQSIMOTI

(haftasiga 2 soatdan, jami 68 soat)

Bo‘lim va ajratilgan soat	Mavzular	O‘quv maqsadlari (standart elementlari)
I BOB. Geometriyaning boshlang‘ich tushunchalari (17 soat)	Eng sodda geometrik shakllar (2 soat): • geometriya fanining vujudga kelishi; • geometriya fanining maqsad va vazifalari; • planimetriya va stereometriya; • geometriyaning boshlang‘ich tushunchalari; • nuqta va to‘g‘ri chiziq.	M7.GO‘.GSH.01. Geometriya fanining vujudga kelish tarixini biladi va fanning maqsad va vazifalarini tushunadi, tegishli misollar keltira oladi. M7.GO‘.GSH.02. Geometriyaning boshlang‘ich tushunchalari mohiyatini tushunadi, eng sodda shakllarni biladi, ularning asosiy xossalarini tushunadi, tegishli misollar keltira oladi.
	Kesma (2 soat): • kesmalarni taqqoslash va o‘lchash; kesma va nur; • geometrik shakllarning tengligi; • kesmalarni taqqoslash; • kesmaning uzunligi va uning xossalari; • kesmalarni o‘lchash; • aylana va doira; • aylana va doiraning elementlari: • markazi, vatari, diametri, radiusi va yoyi; • uzunlik o‘lchov birliklari.	M7.GO‘.GSH.03. Kesma va nurni ta’riflay oladi, ularning asosiy elementlarini va xossalarini biladi. M7.GO‘.YM.01. Kesmalarni sirkul yordamida taqqoslay oladi, uzunligini chizg‘ich bilan o‘lchaydi va ular ustida amallar bajara oladi. M7.GO‘.GSH.04. Aylana va doirani ta’riflaydi, ularning elementlarini biladi va o‘zaro farqlaydi. M7.GO‘.O‘U.01. Uzunlik o‘lchov birliklarini biladi va ikki nuqta orasidagi masofani aniqlay oladi.
	Burchak (2 soat): • burchaklarni taqqoslash va o‘lchash; burchak; • yoyiq burchak; yarim tekislik; • burchakni nurga qo‘yish; • burchaklarni taqqoslash; • burchaklarni o‘lchash; • transportir	M7.GO‘.GSH.05. Burchak va uning elementlarini biladi, burchakning tashqi va ichki sohalarini farqlay oladi. M7.GO‘.O‘U.02. Burchak o‘lchov birliklarini biladi va transportir yordamida burchakni o‘lchaydi va taqqoslay oladi, M7.GO‘.YM.02. Transportir yordamida burchakni yasay oladi.
	Amaliy mashq va tatbiq (1 soat). Bilimingizni sinab ko‘ring.	M7.GO‘.MM.23. Geometrik mushohada yuritadi va masala yechishga doir amaliy masalalarni yecha oladi.

	Summativ baholash. 1-nazorat ishi (2 soat).	
	Burchakning turlari (2 soat): • burchakning turlari; • to‘g‘ri, o‘tkir va o‘tmas burchaklar; • qo‘shni va vertikal burchaklar; • geometriyani o‘rganishda fikrlar ketma-ketligi va bog‘liqligi; • teorema va isbot tushunchalari; • ta’rif, boshlang‘ich tushuncha va aksiomalar.	M7.GO‘.GSH.06. Burchaklarning turlarini biladi, burchak bissektrisasini ta’riflaydi. M7.GO‘.GSH.07. Qo‘shni va vertikal burchaklarni ta’riflay oladi va ularning xossalarini biladi va isbotlay oladi.
	Perpendikulyar to‘g‘ri chiziqlar (2 soat): • perpendikulyar to‘g‘ri chiziqlar; • teskarisini faraz qilib isbotlash usuli; • perpendikulyar va og‘ma; • nuqtadan to‘g‘ri chiziqqacha bo‘lgan masofa; • to‘g‘ri chiziqqa perpendikulyar o‘tkazish algoritmi; • teskarisini faraz qilib isbotlash usuli.	M7.GO‘.GSH.08. Perpendikulyar to‘g‘ri chiziqlarni tasavvur qila oladi va tasvirlay oladi. M7.GO‘.MM.01. Perpendikulyar va og‘mani tasavvur qila oladi va nuqtadan to‘g‘ri chiziqqacha bo‘lgan masofani topa oladi.
	Amaliy mashq va tatbiq (2 soat): Bilimingizni sinab ko‘ring.	M7.GO‘.MM.23. Geometrik mushohada yuritadi va masala yechishga doir amaliy masalalarni yecha oladi.
	Summativ baholash. 2-nazorat ishi (2 soat).	
II BOB. Uchburchaklar	Uchburchak, uning turlari va elementlari (2 soat): • siniq chiziq, uning elementlari, uzunligi; • yopiq siniq chiziq va ko‘pburchaklar, ularning xossalari; • uchburchak; • uchburchak tomoni, burchagi, medianasi, bissektrisasi va balandligi; • uchburchaklarning turlari; • uchburchakning tomonlariga ko‘ra turlari; • uchburchakning burchaklariga ko‘ra turlari.	M7.GO‘.GSH.09. Siniq chiziq, yopiq siniq chiziq, ko‘pburchak va ko‘pburchak elementlarini ta’riflaydi. M7.GO‘.MM.02. Siniq chiziqning elementlarini biladi, uzunligini hisoblaydi. M7.GO‘.MM.03. Ko‘pburchakning perimetrini topa oladi. M7.GO‘.GSH.10. Uchburchakni ta’riflay oladi, uning elementlarini, medianasi, bissektrisasi va balandligi tushunchalarini ta’riflab, chizmada tasvirlaydi. M7.GO‘.MM.04. Teng yonli uchburchak bissektrisasi haqidagi teoremani biladi va qo‘llay oladi. M7.GO‘.GSH.11. Uchburchakning tomonlari va burchaklariga ko‘ra turlarini aytib bera oladi.

	Uchburchaklar tengligining birinchi alomati (2 soat): • uchburchaklar tengligi; • uchburchaklar tengligining TBT (tomon-burchak-tomon) alomati haqidagi teorema;	M7.GO‘.MM.05. Uchburchaklar tengligining birinchi alomatini tushunadi, alomatga ko‘ra teng uchburchaklarni aniqlay oladi va masalalar yechishda qo‘llay oladi.
	Teng yonli uchburchakning xossalari (2 soat): • teng yonli uchburchak va uning elementlari; • teng yonli uchburchakning xossalari;	M7.GO‘.MM.06. Teng yonli uchburchak, uning elementlarini biladi, xossalarini masalalar yechishda qo‘llay oladi.
	Uchburchaklar tengligining ikkinchi alomati (1 soat): • uchburchaklar tengligining BTB (burchak-tomon-burchak) alomati haqidagi teorema;	M7.GO‘.MM.07. Uchburchaklar tengligining ikkinchi alomatini tushunadi, alomatga ko‘ra teng uchburchaklarni aniqlay oladi va masalalar yechishda qo‘llay oladi.
	Uchburchaklar tengligining uchinchi alomati (2 soat): • uchburchaklar tengligining TTT (tomon-tomon-tomon) alomati haqidagi teorema; • kesma o‘rta perpendikulyari tushunchasi va uning xossasi;	M7.GO‘.MM.08. Uchburchaklar tengligining uchinchi alomatini tushunadi, alomatga ko‘ra teng uchburchaklarni aniqlay oladi va masalalar yechishda qo‘llay oladi. M7.GO‘.MM.09. Uchburchaklar tengligi alomatlarini qo‘llagan holda hisoblash va isbotlashga oid masalalarni yecha oladi. M7.GO‘.MM.10. Kesmaning o‘rta perpendikulyari xossasini biladi va uni qo‘llay oladi.
	Amaliy mashq va tatbiq (3 soat): • bilimingizni sinab ko‘ring	M7.GO‘.MM.23. Geometrik mushohada yuritadi va masala yechishga doir amaliy masalalarni yecha oladi.
	Summativ baholash. 3-nazorat ishi (2 soat)	
	Parallel to‘g‘ri chiziqlar (2 soat): • to‘g‘ri chiziqlarning parallelligi; • parallellik aksiomasi va uning tarixi;	M7.GO‘.GSH.12. To‘g‘ri chiziqlarning parallelligi tushunchasi mohiyatini tushunadi va chizmada tasvirlay oladi.

III BOB. Parallel to‘g‘ri chiziqlar (12 soat)	To‘g‘ri chiziqlarning parallelligi va perpendikulyarligi haqidagi teoremalar (2 soat): • ikki to‘g‘ri chiziq va kesuvchi hosil qilgan burchaklar.	M7.GO‘.MM.11. To‘g‘ri chiziqlarning parallelligi va perpendikulyarligi haqidagi teoremalarni biladi va ulardan masalalar yechishda foydalana oladi. M7.GO‘.MM.12. Parallel to‘g‘ri chiziqlarga doir masalalarni yecha oladi.
	Ikki to‘g‘ri chiziqning parallellik alomatlari (3 soat): • ikki to‘g‘ri chiziqning parallellik alomatlari haqidagi teorema va natijalar.	M7.GO‘.GSH.13. Ikki to‘g‘ri chiziq va kesuvchi hosil qilgan burchaklarni tasniflaydi; M7.GO‘.MM.13. Ikki to‘g‘ri chiziqning parallellik alomatlari haqidagi teorema va uning natijalarini biladi hamda ulardan masalalar yechishda foydalana oladi.
	Ikki parallel to‘g‘ri chiziq va kesuvchi hosil qilgan burchaklar (3 soat): • to‘g‘ri va teskari teoremalar; • o‘zaro teng kuchli tasdiqlar; • ikki parallel to‘g‘ri chiziqlar va kesuvchi hosil qilgan burchaklar; • ikki to‘g‘ri chiziqning parallellik alomatlariga teskari bo‘lgan teoremalar.	M7.GO‘.GSH.14. Ikki parallel to‘g‘ri chiziqlar va kesuvchi hosil qilgan burchaklarni farqlay oladi.
	Amaliy mashq va tatbiq (2 soat): • bilimingizni sinab ko‘ring.	M7.GO‘.MM.23. Geometrik mushohada yuritadi va masala yechishga doir amaliy masalalarni yecha oladi.
	Summativ baholash. 4-nazorat ishi (2 soat)	
	Uchburchak ichki burchaklari yig‘indisi (3 soat): • uchburchak ichki burchaklarining yig‘indisi haqidagi teorema; • uchburchakning tashqi burchagi va uning xossasi.	M7.GO‘.MM.14. Uchburchak ichki burchaklari yig‘indisi haqidagi teoremani va uning natijalarini isbotlay oladi. M7.GO‘.MM.15. Uchburchakning ichki va tashqi burchagi haqidagi teoremalardan masalalar yechishda foydalana oladi.

IV BOB. Uchburchakning tomonlari va burchaklari orasidagi munosabatlar (14 soat)	To‘g‘ri burchakli uchburchaklar (2 soat): • to‘g‘ri burchakli uchburchak elementlari va uning xossalari; • to‘g‘ri burchakli uchburchaklarning tenglik alomatlari haqidagi teoremalar.	M7.GO‘.MM.16. To‘g‘ri burchakli uchburchak elementlari va uning xossalarini biladi va ulardan tegishli vaziyatlarda foydalana oladi. M7.GO‘.MM.17. To‘g‘ri burchakli uchburchaklarning tenglik alomatlari haqidagi teoremalarni biladi va ulardan masalalar yechishda foydalana oladi;
	Burchak bissektrisasining xossalari (2 soat): • to‘g‘ri burchakli uchburchak gipotenuzasiga tushirilgan medianasi xossasi; • burchak bissektrisasining xossasi haqidagi teorema.	M7.GO‘.MM.18. To‘g‘ri burchakli uchburchak gipotenuzasiga tushirilgan medianasi xossasini biladi undan masalalar yechishda foydalana oladi; M7.GO‘.MM.19. Burchak bissektrisasining xossasini biladi va undan masalalar yechishda foydalana oladi;
	Uchburchakning tomonlari va burchaklari orasidagi munosabatlar (3 soat). • uchburchakning tomonlari va burchaklari orasidagi munosabatlar haqidagi teoremalar; • uchburchak tengsizligi haqidagi teorema.	M7.GO‘.MM.20. Uchburchakning tomonlari va burchaklari orasidagi munosabatlar haqidagi teoremalarni biladi va masalalar yechishda foydalana oladi; M7.GO‘.MM.21. Uchburchak tengsizligi haqidagi teoremani biladi va undan masalalar yechishda foydalana oladi; M7.GO‘.GSH.15. Uchburchakning tomonlari va burchaklarini taqqoslay oladi (katta tomon qarshisida katta burchak yotadi va aksincha…);
	Amaliy mashq va tatbiq (2 soat): • bilimingizni sinab ko‘ring.	M7.GO‘.MM.23. Geometrik mushohada yuritadi va masala yechishga doir amaliy masalalarni yecha oladi.
	Summativ baholash. 5-nazorat ishi (2 soat).	

V BOB. Yasashga doir masalalar. (5 soat)	Sirkul va chizg‘ich yordamida geometrik yasashga doir masalalar (2 soat): • geometrik yasashlarga oid qoidalar; • geometrik yasashga doir asosiy masalalar; • berilgan burchakka teng burchakni yasash; • burchak bissektrisasini yasash; • berilgan to‘g‘ri chiziqqa perpendikulyar to‘g‘ri chiziq yasash; • berilgan kesmani teng ikkiga bo‘lish; • uchburchakni berilgan uch tomoniga ko‘ra yasash.	M7.GO‘.YM.03. Burchak bissektrisasini yasay oladi. M7.GO‘.YM.04. To‘g‘ri chiziqqa perpendikulyar o‘tkazish algoritmini biladi va o‘tkaza oladi. M7.GO‘.YM.05. Kesmani teng ikkiga bo‘lish algoritmini biladi va shu asosida kesmani teng ikkiga bo‘la oladi. M7.GO‘.YM.06. Sirkul va oddiy chizg‘ich yordamida berilgan burchakka teng burchakni yasay oladi.
	Amaliy mashq va tatbiq (1 soat): • bilimingizni sinab ko‘ring.	M7.GO‘.MM.23. Geometrik mushohada yuritadi va masala yechishga doir amaliy masalalarni yecha oladi.
	Summativ baholash. 6-nazorat ishi (2 soat)	
Takrorlash (6 soat)	Takrorlasha doir masalalar (2 soat): • geometrik masalalarni yechish bosqichlari; • geometrik masalalarning turlari; • hisoblashga doir masalalar; • isbotlashga doir masalalar.	M7.GO‘.MM.22. Isbotlashga oid masalalar mohiyatini biladi va sodda hollarda ularni isbotlay oladi.
	Amaliy mashq va tatbiq (2 soat): • bilimingizni sinab ko‘ring.	M7.GO‘.MM.23. Geometrik mushohada yuritadi va masala yechishga doir amaliy masalalarni yecha oladi.
	Summativ baholash. Yakuniy nazorat ishi (2 soat)	

1.1 MATEMATIKA FANINI O‘QITISHGA METODIK YONDASHUVLAR

Matematika fanini o‘qitishga doir metodik tavsiyalar

Mamlakatimiz rivojlanishining hozirgi davrida jahon standartlari bo‘yicha ta’limning yangi ustuvor yo‘nalishlari belgilandi. Maktab ta’lim sifatini yaxshilashning asosiy yo‘naltiruvchi nuqtasi sifatida maktab o‘quvchilarining funksional savodxonligini oshirish, ularning jamiyatda faol ishlash, o‘z taqdirini o‘zi belgilashi, o‘z-o‘zini takomillashtirish hamda o‘zini o‘zi ro‘yobga chiqarish qobiliyatlarini talab qiladi.

Ilg‘or xalqaro tajribalar tahlillaridan kelib chiqib aytish mumkinki, maktablarda o‘quvchilarning matematika fanidan funksional savodxonligini rivojlantirish amaliy faoliyat standartlarining quyidagi yo‘nalishlarini qamrab oladi:

– matematikaga oid ta’riflar, formulalar va boshqa faktlarni o‘quv va ma’lumotnomalardan qidirish va foydalanish;

– turli hayotiy vaziyatlarda algebraga doir bilim, ko‘nikma va grafik malakalarni qo‘llash;

– ma’lumotlarni to‘plash, tahlil qilish, qayta ishlash, sintez qilish;

– matematik formuladan foydalanish, muayyan xususiy hollarni umumlashtirish asosida miqdorlar orasidagi bog‘liqlikni ifodalovchi formulalarni mustaqil ravishda tuzish;

– o‘zlashtirilgan algebraik almashtirishlarni funksional grafik tasvir va tasavvurlarni tevarak-atrofdagi yoki boshqa fanlardagi tegishli obyektlarni ifodalash va tahlil qilishda qo‘llash;

– o‘z nuqtayi nazarini asoslay olish, uning muhokamasida ishtirok etish va mantiqiy jihatdan to‘g‘ri xulosa chiqarish;

– matematik matn bilan ishlash (tahlil qilish va kerakli ma’lumotlarni chiqarib olish), o‘z fikrini matematik atamalar, timsollar va ramzlar yordamida aniq va to‘g‘ri yozish hamda og‘zaki va yozma izhor qila olish;

– amaliy xarakterdagi hayotiy masalalarni yechish, zarur hollarda ularni yechishda kerakli ma’lumotnomalar va hisoblash vositalarini qo‘llay olish,

– jadvallar, diagrammalar, grafik ko‘rinishdagi real raqamli ma’lumotlarni hamda statistik xarakterdagi ma’lumotlarni tahlil qilish;

– amaliy xarakterdagi matematik muammolarni hal qilish vositasi sifatida zamonaviy axborot texnologiyalaridan foydalanish.

Buning uchun matematika fanini o‘qitishda quyidagilarga e’tibor berish tavsiya etiladi:

– an’anaviy va zamonaviy o‘qitish usullarini uyg‘unlashtirib olib borish;

– puxta tanlangan topshiriqlar va mashg‘ulotlar orqali o‘quvchilarni rag‘batlantirish va rivojlantirish;

– o‘rganishni baholash orqali o‘quvchilarning bilim olishlarini qo‘llab-quvvatlash;

– o‘quvchilarning kichik o‘quv kashfiyotlari asosida faol o‘rganishni rag‘batlantirish;

– o‘quvchilarning kreativ va tanqidiy fikrlash qobiliyatlarini rivojlantirish;

– butun sinf ishini, individual va guruh faoliyatini tashkil etish orqali o‘quvchilarning hamkorlikda ishlash ko‘nikmalarini rivojlantirish;

– matematik nutqni to‘g‘ri va aniq shakllantirish;

– matnli masalalarni yechishda matematik mazmun va usullarni ajratib ko‘rsatish va yangi holatga qo‘llash;

– masala shartlarini matnli ko‘rinishdan matematik tilga o‘girish va bu shakl almashtirishlarning mazmun va mohiyatini ochib berish;

– mavzuni chuqurroq o‘rganish imkonini beradigan tabaqalashtirilgan yondashuv asosida o‘quvchilarda ijodiy ishlash ko‘nikmalarini shakllantirish va faol aqliy harakatlarni amalga oshirishlari uchun muammoli vaziyatlarni yaratish;

– ta’lim jarayonida o‘quvchilarning tabaqalashtirilgan individual shug‘ullanish trayektoriyalarini yaratish;

– darsda interfaol va faol ta’lim texnologiyalari: loyiha, tadqiqot, evrestik, keys, muammoli o‘qitish kabi metodlardan o‘rnida foydalanish.

Yuqoridagilardan kelib chiqib, matematika fanini o‘qitishda quyidagi metodik jihatlarga e’tibor qaratish tavsiya etiladi:

1. Ta’lim jarayonining mohiyati shunchaki, katta hajmdagi o‘quv materialini o‘rganishga emas, balki kiritilayotgan matematik atama va faktlarni o‘quvchilarning chuqurroq tushunishlariga e’tibor berish lozim. Odatdagi, xususan, bizning maktab matematika fani o‘quv dasturlarimizda buning aksi: o‘quv yuklamasi juda katta, o‘rganilishi kerak bo‘lgan mavzular juda ko‘p, vaqtimiz esa cheklangan. Oqibatda bu mavzularni chuqur o‘rganish imkoniyatlari cheklanadi. Har bir mavzu chuqurroq o‘rganilishi lozim. O‘quvchilar oldin o‘rganilgan mavzuga takrorlash uchun emas, balki chuqurroq o‘rganish maqsadida qayta-qayta murojaat qilishi kerak, ya’ni mavzuga jiddiyroq darajada chuqurroq o‘rganish uchun yana qaytish lozim. O‘quvchilar o‘zlashtirish darajasining yuqori bo‘lishini darsdan keyingi mashg‘ulotlar evaziga ushlab turish mumkin. Sinfda mavzularni o‘zlashtirmagan qoloq o‘quvchi bo‘lmasligi kerak. Hamma e’tiborni barcha o‘quvchilar tomonidan mavzuning ma’lum darajada o‘zlashtirilishiga qaratish kerak bo‘ladi. Bu darajani oldinroq o‘zlashtirgan o‘quvchilar, boshqalar ham bu darajaga yetishgunga qadar mavzuni chuqurroq o‘rganishga o‘tishadi.

2. Ta’lim jarayonini muayyan amaliy tajribadan boshlab abstrakt tushunchalar tomon olib borish lozim. Tushunchalarni o‘rganish uch bosqichda olib boriladi.

Birinchi bosqichda o‘quvchilar kiritilayotgan tushunchaga doir turli amaliy faoliyat bilan shug‘ullanadilar, tushunchaga doir turli moddiy narsalarni qo‘llari bilan ushlab ko‘radilar yoki ulardan turli modellarni yasaydilar.

Ikkinchi bosqichda yangi tushunchani timsollar yordamida ifodalaydilar. Ularni turli rasmlarda, diagramma yoki chizmalarda tasvirlaydilar.

Shundan keyingina uchinchi bosqichga – yangi tushunchaga oid abstrakt ta’rif, matematik timsol va belgilashlarga o‘tiladi. Boshqacha qilib aytganda, matematik tushunchalar bilan tanishish ko‘rgazmali misoldan boshlanadi, uning asosida abstrakt tushunchani “ushlash” va “ko‘rish” imkoniyati beriladi.

Ta’limning amaliy tajribadan abstrakt tushunchalarga tomon borishi o‘quvchilarda har bir mavzu bo‘yicha muayyan assotsiatsiyalar (yorqin, xotirada chuqur va mustahkam o‘rnashuvchi taassurotlar) hosil qiladi. Bu taassurotlar eslanganda mavzuning turli jihatlari yodga tushishi ta’minlanadi.

Ta’lim jarayonining boshidan amaliy ishga yo‘naltirilganligi u yoki bu matematik tushunchaning nima sababdan o‘rganilayotganligi, uning hayotiy vaziyatlarda qachon va qayerda kerak bo‘lishini oldindan bilishga hamda ta’lim olishga bo‘lgan motivatsiyani (qiziqishni) oshiradi. Bu esa matematika fani hayotda kerakli va foydali bo‘lishi bilan birga, jozibador fan ekanligini ham anglashlariga yordam beradi.

3. Matematik modellashtirishga alohida e’tibor qaratish lozim. Bu bilan berilgan masala sharti ko‘rgazmali qilib vizuallashtiriladi. Masala modellashtiriladi va berilganlardan qulay ravishda foydalanish tashkil qilinadi va bosqichma-bosqich masalani yechishga kirishiladi.

4. Hamkorlikda o‘rganish va o‘zaro muloqotga katta e’tibor berish lozim. Masalalarni yechishda o‘quvchilarga matematik tushunchalarni va masalalar bo‘yicha o‘z fikrlarini bildirish, ularni birgalikda muhokama qilish va boshqalarning fikrini ham tinglash imkoniyati yaratiladi. Natijada o‘quvchilar tushunchani yaxshiroq o‘zlashtirishadi, matematika tilidan to‘g‘ri foydala-

nishga o‘rganishadi, ba’zi hollarda u yoki bu masalaning bir necha yechimi bo‘lishi mumkinligini tushunib yetishadi. O‘quvchilarni har safar masala yechayotganda masala sharti, uni yechish usullari va yechimi haqida sinfdoshlariga ovoz chiqarib so‘zlab berishga undash lozim. Bu esa o‘z navbatida mavzuni, masalani yechish yo‘llarini yaxshiroq eslab qilishlarini ta’minlaydi. Shuningdek, o‘quvchilar bir necha kishilik kichik guruhlarda masalani jamoa bo‘lib yechish, mavzuni qanday tushunganliklarini bir-birlariga aytib berish, yechimlarni muhokama qilish hamda topshiriqlarni jamoa bo‘lib bajarish kabi interfaol ishlar bilan shug‘ullanishlarini tashkil qilish lozim.

5. O‘quvchilarni eslab qolishga emas, masala (muammo)ni yechishga o‘rgatish lozim. Odatda darsni yangi turdagi masalani yechish qoidasidan emas, balki bevosita notanish masalani yechishdan boshlash tavsiya qilinadi. O‘quvchilar oldingi bilim va ko‘nikmalari asosida intuitiv ravishda masalani yechishga urinib ko‘radilar. Ular birgalikda “urinish, xato qilish va uni tuzatish” orqali mulohaza yuritadilar, xatolar qiladilar hamda bu xatolar ustida ishlashadi, shu asosida to‘g‘ri yechimga bosqichma-bosqich yaqinlashib borishadi. Bu o‘rinda o‘quvchilar xato qilish unchalik yomon ish emasligini, aynan turli xato yechimlarni tahlil qilish va tekshirish (kichik tadqiqot) jarayoni bora-bora ularni to‘g‘ri yechimga olib borishini o‘z tajribalari asosida tushunib yetishadi.

Matematika ta’limiga kompetensiyaviy yondashuv

Matematika ta’limiga kompetensiyaviy yondashuv kasbiy, shaxsiy faoliyatga doir kundalik hayotda uchraydigan holatlarda samarali harakat qilishga imkon beradigan turli ko‘rinishdagi malakalarni o‘quvchilar tomonidan egallanishini nazarda tutadi. Shunga ko‘ra, kompetensiyaviy yondashuvda matematik ta’limning amaliy va tatbiqiy yo‘nalishlarini kuchaytirishga e’tibor qaratiladi.

Matematika darslarini tashkil qilishda nazariyadan ko‘ra ko‘proq amaliyotga e’tibor berish hamda o‘quvchilarga tayyor o‘quv materiallarini berishga asoslangan yondashuvdan ma’lum darajada voz kechish talab qilinadi. Matematika darslarida ko‘proq keys, tadqiqot, loyiha, kichik o‘quv kashfiyotlari kabi interfaol metodlardan foydalanish tavsiya etiladi. O‘quvchilarda kichik tadqiqotchilik ko‘nikmalarini shakllantirishda kuzatish, tajriba, o‘lchashlar, analiz (tahlil) va sintez, induksiya va deduksiya, taqqoslash va analogiya kabi ilmiy izlanish metodlaridan o‘rnida foydalanish talab etiladi. O‘quvchilarda bilim va ko‘nikmalarni shunchaki shakllantirib qolmasdan, ularni hayotiy vaziyatlarda qo‘llay olish kompetensiyalarini ham tarkib toptirish muhim ahamiyat kasb etadi.

STEAM – ijodkorlik texnologiyasi

STEAM (S – *science* – tabiiy fanlar, T – *technology* – texnologiya, E – *engineering* – muhandislik, A – *art* – san’at, M – *mathematics* – matematika) ta’lim texnologiyasi aniq fanlar blok-modulida o‘quvchilarning egallagan bilim, ko‘nikma va malakalarining kundalik hayot bilan bog‘liqligini ko‘rsatishda dars va sinfdan tashqari mashg‘ulotlarda o‘quv tadqiqotlarini o‘tkazish, tajribalarni bajarish, loyihalashtirishga yo‘naltirilgan ijodkorligini tarbiyalash, yangiliklar yaratishga bo‘lgan qiziqishlarini rivojlantirishga qaratilgan. Bu texnologiyani amalga oshirishda o‘quvchilar tomonidan turli texnik qurilmalarni yasash uchun loyihalar yaratish, loyiha asosida qurilmaning maketini yaratish va uni amaliyotda ishlatib ko‘rish, kamchiliklarini topish hamda uni bartaraf etish kabi vazifalar bajariladi.

Loyiha ishi – amaliy faoliyat ko‘zgusi

O‘quvchilarda tayanch va fan bo‘yicha amaliy faoliyat kompetensiyalarini shakllantirish, kichik o‘quv tadqiqotlarini bajarish orqali umumta’lim fanlarini o‘rganishga qiziqishni kuchaytirish maqsadida fan o‘quv dasturlariga loyiha ishi kiritildi. Bu holat nafaqat muayyan o‘quv fani bo‘yicha o‘zlashtirish sifatini yaxshilaydi, balki fanlararo va fanning

kundalik turmush bilan bog‘lanish imkoniyatlarini ochadi va ta’lim samaradorligini oshiradi.

O‘quv loyihasi bu – uzoq vaqtga mo‘ljallangan, o‘rganilgan mavzu yoki bo‘limni yana-da chuqurroq o‘rganishga yo‘naltirilgan, ta’lim jarayoniga tajriba, amaliy faoliyat asosida yondashuvga imkon beruvchi, tadqiqotchilik va izlanishga doir metodlardan foydalanishni talab etuvchi ta’limni tashkil etish shakli.

Loyihalashtirish real natijaga olib keluvchi, qat’iy tartibga solingan harakatlar izchilligini o‘z ichiga oluvchi muammoni o‘zgartiruvchi faoliyatni anglatadi.

Hozirgi vaqtda ta’lim amaliyotida o‘quv loyihasining xilma-xil turlaridan foydalaniladi. Yetakchi faoliyat turiga ko‘ra, loyihalar axborotli, amaliy yo‘naltirilgan va tadqiqot turlariga bo‘linadi.

Masalan, agar o‘qituvchi o‘quvchida axborotlar bilan ishlash malakalarini, matnni tahlil etish, turli manbalardagi ma’lumotlarni tasniflash va tekshirish ko‘nikmalarini rivojlantirishni o‘z oldiga maqsad qilib qo‘ysa, u holda axborotli tavsifdagi o‘quv loyihasidan foydalanishi maqsadga muvofiq. Axborotli tavsifdagi loyihaning maqsadi aynan ma’lumotlarni to‘plash, axborotlarni rasmiylashtirish va taqdim etishdan iborat. Albatta, o‘quv loyihasining istalgan turida axborot to‘plash bosqichi bor, biroq bu yerda u o‘quv ishi vositasi bo‘lib xizmat qiladi, axboriy tavsifdagi loyihada esa asosiy maqsad sifatida belgilanadi. Mazkur holatda o‘quvchi faoliyati aynan axborotlar bilan ishlashga yo‘naltiriladi. Shu bilan birgalikda, o‘quvchida ma’lumotlar bilan ishlash kompetentligini rivojlantirish asosiy vazifa sifatida belgilanadi.

Ma’lum bir fan yoki fanlarga doir amaliy ko‘nikma va malakalarni rivojlantirish zaruriyati paydo bo‘lganda amaliy yo‘naltirilgan loyihalardan foydalanish yaxshi samara beradi. Eng oddiy holatda o‘qituvchi o‘quvchilarga muayyan muammoning matematik modelini tuzish va uni yechish, fanga doir o‘quv va tarqatma materiallarni yoki glossariy yaratish topshirig‘ini berishi mumkin. Amaliy yo‘naltirilgan loyihalar bilan ishlash jarayonida o‘quvchilarda fanga doir bilim, ko‘nikma va malakalar rivojlanibgina qolmay, balki matematik modellashtirish, muammoni hal qilish kabi amaliy faoliyatga doir kompetentlik ham qaror topadi. O‘quvchilarning analitik, tanqidiy fikrlash qobiliyatini rivojlantirish, idrok etishning mantiqiy usullarini o‘zlashtirish va katta hajmdagi axborotlarni qayta ishlash maqsad qilib qo‘yilsa, tadqiqotchilikka doir o‘quv loyihasidan foydalanish maqsadga muvofiq. Mazkur o‘quv loyihasining maqsadi loyiha farazini asoslab berishdan iborat. Ushbu maqsadga erishish uchun tajriba-sinov ishlari o‘tkazish, olingan natijalarni tahlil etish, umumlashtirish, taqqoslash, rivojlanish qonuniyatlarini aniqlash, bundan tashqari, xulosalar chiqarish, o‘z nuqtayi nazarini asoslash zarur. Ana shu tarzda tadqiqotchilikka doir o‘quv loyihasida asosiy e’tibor mulohaza yuritish kompetentligini rivojlantirishga qaratiladi.

O‘quv loyihasida eng katta e’tibor o‘quvchilarda ijodiy qobiliyatlarni rivojlantirishga qaratiladi. Aynan loyihalar o‘quvchilarga o‘zini namoyon eta olish, istalgan janrdagi asarni yaratish imkonini beradi. Shuningdek, loyihalar o‘quvchilarni guruhdagi maqomining oshishi, o‘z-o‘zini baholashga imkon berishi orqali ularning ijodiy qobiliyatlarini rivojlantiradi. Har qanday ijodiy ish uni taqdim etish va sinf jamoasi bilan qayta aloqani taqozo etadi.

Shu sababli loyihalar o‘quvchilarda ma’lumotlar bilan ishlash, matematik modellashtirish, muammoni hal qilish, mulohaza yuritish, muloqot qilish kabi amaliy faoliyat kompetensiyalarini rivojlantirishga katta ta’sir ko‘rsatadi.

Loyiha ishi bo‘yicha o‘quvchilar faoliyatini tashkil qilish

O‘quvchilar bir o‘quv yilida o‘zlari qiziqqan fani yoki ta’lim sohasidan faqat bitta loyiha ishini bajarishlari tavsiya etiladi. Loyiha ishi mavzulari o‘qituvchilar tomonidan bitta yoki bir necha o‘quv fanlari doirasida muammoli vaziyat yoki keys sifatida tanlanadi. Loyiha ishi mavzusi ustida o‘quvchilar

alohida-alohida yoki qiziqishlariga qarab 3-4 kishilik guruh bo‘lib ishlashlari ham mumkin. Loyiha ishi o‘quv yili oxirida o‘tkaziladigan himoya bilan tugaydi. Himoya bitta yoki bir necha o‘quv fanlari doirasida konferensiya tarzida o‘tkazilishi mumkin.

Loyiha ishi ustida o‘quvchilarning individual yoki guruhiy bo‘lib ishlashi quyidagi o‘quv faoliyatlarini o‘z ichiga olgan ishlab chiqish bosqichlaridan iborat bo‘lishi mumkin:

– *tayyorgarlik bosqichi*: o‘z izlanish faoliyatlarini rejalashtirish, motivatsiya, muammoli vaziyatni aniqlash, tadqiqot mavzusini tanlash;

– *loyihalash bosqichi*: loyihaning maqsadini belgilash, faoliyatni amalga oshirishning aniq rejasini tuzish, vazifalarni o‘zaro taqsimlab olish;

– *amaliy bosqich:* muammoni tadqiq etish, kerakli ma’lumotlarni to‘plash va qayta ishlash, muammoning matematik modelini yaratish, matematikani qo‘llash, muqobil yechimlarini aniqlash va ulardan eng maqbulini tanlash hamda uni asoslash;

– *tahlil va talqin bosqichi*: zarur hollarda so‘rovlar yoki tajribalar o‘tkazish, rejalashtirilgan ishlar va olingan natijalarni taqqoslash, tahlil qilish, real muammoni talqin qilish, umumlashtirish va xulosalash;

– *nazorat va baholash bosqichi*: o‘z faoliyatlarini tahlil qilish va baholash, ijobiy natijalarni va yo‘l qo‘yilgan xatolarni tahlil etish, xatolarni to‘g‘rilash yo‘llarini izlash, real holat bilan bog‘liqlikda loyihaga o‘zgartirishlar kiritish;

– *natijalarni rasmiylashtirish bosqichi*: loyiha ishi natijalari bo‘yicha hisobot tayyorlash;

– *yakuniy bosqich*: loyiha ishi himoyasi uchun taqdimot tayyorlash va uni himoya qilish.

O‘quvchilar loyiha ishi bo‘yicha izlanishlarini odatda darsdan tashqari mustaqil mashg‘ulotlarda olib borishadi. Dasturda belgilangan dars soatlarida esa turli loyiha ishlaridan namunalarni muhokama qiladilar, birgalikda muayyan loyiha ishi bo‘yicha guruhlarda ishlashadi, shu bilan birga, o‘z loyiha ishlari mavzusi bo‘yicha maslahatlar oladilar.

Yuqoridagilardan ko‘rinib turibdiki, loyiha ishi bo‘yicha o‘quvchilar faoliyati an’anaviy ta’limdan tubdan farq qiladi. Zero bunda o‘quvchilarga bilimlar tayyor holda uzatilmaydi, balki muammo tarzida qo‘yiladi, o‘quvchilar qo‘yilgan muammoni o‘zlari mustaqil yechadilar. Bilimlar o‘qitishning maqsadi bo‘lmay, muammoni yechish vositasiga aylanadi. O‘quvchilar yangi bilimlarni o‘zlashtirishning o‘zlari uchun qanchalik zarur ekanini his qiladilar, bu esa ularda motivatsiyaning sezilarli darajada o‘sishiga olib keladi. Ularning o‘quv-amaliy faolligi kuchayadi. Avvalo, mustaqil ishlash darajalari ortadi. O‘quvchilar kichik guruhlarga bo‘linib, muammoni aniqlab oladilar, uni hal qilish uchun qanday manba va bilimlar kerakligini belgilaydilar, mazkur manbalar bilan ishlaydilar, muammoni hal etish variantlarini umumlashtiradilar. Bunda o‘qituvchi shunchaki jimgina kuzatib turuvchi bo‘lmay, zarur paytda o‘quvchilarga kerakli maslahat va yordam berib turadi.

MATEMATIKA FANINING BOSHQA FANLAR BILAN INTEGRATSIYASI

Matematika fanini o‘qitishda nafaqat uning bo‘limlar orasidagi o‘zaro ichki, balki tashqi, ya’ni STEAM yoki turdosh blok-modullar tarkibiga kiruvchi fanlar bilan integratsiyasi ham katta ahamiyatga ega.

Jumladan, matematikaning quyidagi fan yo‘nalishlari bilan o‘zaro chambarchas aloqalari muhim hisoblanadi.

Matematika va tabiiy fanlar

Matematika va tabiiy fanlar orasidagi bog‘liqlik modellashtirish, o‘lchashlar, tajriba, tadqiqotlar, tajribaga asoslangan (empirik) mulohazalarga quriladi. Tabiiy fanlar va matematikada o‘quvchilar miqdorlar va munosabatlar, tabiat qonunlari ifodalovchi modellarni ishlab chiqadilar. Ular avval turli noan’anaviy birliklar yordamida, keyin rasmiy birliklar yordamida o‘lchash bilan tanishadilar. Keyinchalik o‘lchashda noaniqlik va ishonchlilik masalalarini ko‘rib chiqadilar. O‘quvchilar sifat va miqdoriy ma’lumotlarni yig‘adilar, ularni tahlil qiladilar va turli ko‘rinishlarda ifodalaydilar. O‘quvchilar sonli ma’lumotlar va grafiklar asosida ma’lumotlarni tahlil qilish, turli qonuniyatlarni aniqlash ko‘nikmalarini egallaydilar.

Fizika fanini o‘qitishda o‘quvchilar tabiat hodisalarini va asosiy fizik jarayonlarni anglash bilan birga, texnika va texnologiyalarni rivojlantirishda matematik formulalarni qo‘llashni o‘rganadilar. Ko‘pgina fizik masalalar tenglama yoki tenglamalar sistemasini tuzish va ular bilan ishlash ko‘nikmasining shakllangan bo‘lishini taqozo etadi. Fizika fanini o‘qitishda matematika nafaqat hisoblash apparati sifatida muhim, balki u matematik mulohazalar yordamida voqelik, hodisaning xarakteri haqida fizik xulosalar chiqarishga hamda mazkur jarayonlarni tadqiq qilish, matematik tenglamalarni yechish orqali fizik hodisalar haqida fikr yuritish imkonini ham beradi. Fizik masalalarni matematika darslarida tahlil qilish o‘quvchilarning mantiqiy fikrlash qobiliyatini,olam haqidagi tasavvurlarini kengaytirish hamda egallagan bilimlaridan hayotiy muammolarni hal qilish, kundalik faoliyatlarida foydalanish ko‘nikmasini shakllantirishni ko‘zda tutadi.

Biologiya fani o‘quvchilarda jonli tabiatning obyekti va tizimini his etish qobiliyatini, jonli va jonsiz tabiat o‘rtasidagi aloqalarni shakllantiradi. Shu bilan birga ularda atrofimizni o‘rab turgan jonli tabiatga nisbatan ijobiy munosabat, tabiiy rang-baranglikni saqlab qolish, shuningdek, javobgarlikni his qilgan holda mustahkam hayotiy faoliyat shakllanadi. Matematika darslarida jonli tabiatning biologik qonuniyatlari va modellari haqidagi hayotiy masalalarni tahlil qilish orqali bu ikki fan o‘rtasidagi integratsiya ta’minlanadi.

Kimyo fani o‘quvchilarda organik va anorganik moddalar va tuzilmalarni tabiatning obyekti sifatida his etish ko‘nikmalarini shakllantiradi. Matematika darslarida moddalar va tuzilmalarning tuzilishiga oid geometrik, sifat va miqdoriy kattaliklarni tahlil qilish, ularning kimyoviy xususiyatlarini o‘rganish, tadqiq qilish hamda xulosa chiqarish orqali bu ikki fan orasidagi uzviy aloqadorlik ta’minlanadi.

Geografiya fani o‘quvchilarda tabiat in’omlari va insonning iqtisodiy faoliyati natijasida yaratilgan obyektlarni tizimli ravishda, birgalikda his etish ko‘nikmalarini shakllantiradi. Matematika darslarida geografik obyektlarga doir hayotiy masalalarni yechish va tahlil qilish orqali bu ikki fan orasidagi aloqadorliklar aniqlanadi.

Matematika va raqamli texnologiyalar

Matematika va raqamli texnologiyalar orasidagi aloqadorlik ma’lumotlar, hisoblash va algoritmik fikrlash asosiga quriladi. Axborot kommunikatsiya texnologiyalaridan (AKT) foydalanish kompetensiyasi ta’lim olish va kundalik turmushda mazkur texnologiyalarni mohirona va ijodiy qo‘llashni o‘z ichiga oladi.

Informatika va axborot texnologiyalari fani yutuqlari turli xil axborot-kommunikatsiya texnologiyalari va kompyuterlar texnikasidan foydalanish matematika fanini o‘qitish jarayonining samaradorligini oshirish imkonini yaratadi. O‘quvchilar ta’lim olish jarayonida axborotni izlash, yaratish va qayta ishlash, ma’lumot va fikrlar almashish, multimediali kompyuter texnikasi, dasturiy ta’minotlar va ilovalar yordamida o‘z faoliyatlarini baholash va takomillashtirish orqali AKT ko‘nikmalarini rivojlantiradilar. Matematikada algoritmlar yaratish va loyihalash, loyihani amalga oshirish ta’limda hisoblashga asoslangan yondashuvni hamda matematikada tajribalar o‘tkazishning ajralmas qismini tashkil etadi. Matematika fanidan bajariladigan loyihalar doirasida tajribalar o‘tkazish asosida o‘rganishni raqamli texnologiyalar to‘ldiradi, hisoblash va algoritmik fikrlash ko‘nikmalarini rivojlantirishni qo‘llab-quvvatlaydi.

AKT quyidagi amaliy faoliyat yo‘nalishlari bo‘yicha ko‘nikmalarni shakllantirishga xizmat qiladi:

– o‘quvchilarda axborot qidirish, uni saralash, faktlar va hodisalar o‘rtasidagi bog‘liqlik va farqlarni solishtirish hamda o‘rnatish bilan bog‘liq mustaqil ishlash ko‘nikmalarini rivojlantirish;

– matematikani mustaqil o‘rganish imkoniyatini beradigan turli ta’lim platformalarida (masalan, *ixl.com, uz.khanakademy.org* va hokazolarda) ishlash;

– matematikaning turli bo‘limlarini o‘rganishda ko‘rgazmalilikni ta’minlash (masalan, geometriyada **GeoGebra** dasturi yordamida);

– o‘quvchilarning turli dasturiy muhitlardan foydalangan holda matematik modellashtirish ko‘nikmalarini oshirish;

– o‘quvchilarda turli xil dasturiy muhitlar yordamida farazlarni ilgari surish va ularni sinab ko‘rish qobiliyatini rivojlantirish (masalan, ehtimollikka doir masalalarni yechishda **Excel** ilovasidan foydalanish);

– o‘quvchilarning loyihalarni amalga oshirishlarida, tadqiqotlar o‘tkazishlarida katta hajmdagi hisoblashga doir topshiriqlarni bajarish jarayonida vaqtni tejash uchun muhandislik kalkulyatori bilan ishlash ko‘nikmalarini shakllantirib borish;

– o‘z-o‘zini nazorat qilish ko‘nikmalarini rivojlantirishga yordam beradigan elektron darsliklardan foydalangan holda o‘quvchilarga ta’lim berish;

– internet-olimpiadalarda va olimpiadaning saralash bosqichi bo‘lgan masofaviy fan olimpiadalarida ishtirok etish orqali matematik qobiliyat va ijodiy faollikni rivojlantirish (masalan, IMO xalqaro matematika olimpiadasi, IMC xalqaro matematika musobaqasi, “Kenguru” xalqaro olimpiadasining onlayn turlarida);

– ta’lim olishga yo‘naltirilgan onlayn ijtimoiy tarmoqlarda, portallarda, videokonferensiyalarda yoki forumlarda ishtirok etish orqali matematik ko‘nikmalar va matematik tilni rivojlantirish;

– maxsus dasturlar yordamida kichik o‘quv saytlari, multimedia ilovalari, videoroliklarni yaratish, baholash bo‘yicha dasturiy ta’minotlardan foydalanish ko‘nikmalarini shakllantirish.

Matematika, dizayn va texnologiyalar

Dizayn va texnologiyalar o‘quvchilarga matematik bilim va ko‘nikmalarni bir qator hayotiy vaziyatlarda talqin qilish va ulardan foydalanish imkoniyatlarini beradi. O‘quvchilar sondan baholash va o‘lchash, statistikadan olgan natijalarini sharhlash va xulosa chiqarish uchun foydalanadilar. G‘oyalar ishlab chiqarish jarayonida o‘lchaydilar va sonlar yordamida qayd etadilar. G‘oyalarni ishlab chiqish, takomillashtirish va sinash hamda loyihalarni boshqarishda sonlardan foydalanadilar. Ular uch o‘lchamli modellardan foydalanadilar, aniq texnik chizmalar yaratadilar, raqamli modellar bilan ishlaydilar va eng yaxshi yechimlarni ishlab chiqish va yaratishda, qaror qabul qilish jarayonlarida, miqdoriy mulohaza yuritishda foydalanadilar. Texnologiya fani orqali tarkib toptirilgan kompetensiyalar matematika fanini o‘qitish jarayonida o‘quvchilarni kasb-hunarga yo‘naltirish, ularning texnik ijodkorlik qobi-

liyatlarini rivojlantirish hamda ijodiy loyiha tayyorlash malakalarining hosil bo‘lishida muhim ahamiyatga ega.

Matematika va san’at

Matematika va san’at uyg‘unligi qonuniyatlarni tushunish, o‘lchash va fazoviy tasavvur va fikrlash ustiga quriladi. Matematikada o‘quvchilar bu bilimlardan masalalar yechishda va modellashtirishda foydalanadilar. San’atda badiiy asarlarni yaratish, talqin qilish, tahlil qilish va o‘rganishda matematik bilimlar qo‘llanadi. Matematika va san’at o‘quvchilarga tabiiy va sun’iy muhitlarni o‘rganish va ularni kuzatish imkoniyatini beradi. O‘quvchilar matematik bilimlarini tasviriy, ovozli va kinestetik kabi san’at shakllari orqali uzatishlari mumkin. O‘quvchilarga muayyan san’at jarayonlari yoki amaliyotlaridan foydalanganda matematik tushunishni qo‘llash imkoniyati beriladi. Masalan, musiqada o‘quvchilar kompozitsiya tuzishda naqsh va algoritmlar haqidagi bilimlarni qo‘llashlari mumkin.

Matematika va ijtimoiy fanlar

Matematika va ijtimoiy fanlar uyg‘unligida moliyaviy savodxonlik va tadqiqot ma’lumotlarini tahlil qilishga e’tibor beriladi. Bu moliyaviy va biznes qarorlarini qabul qilish uchun moliyaviy menejment tamoyillarini tushunishni o‘z ichiga oladi.

Ona tili va adabiyot, xorijiy tillar orqali shakllantiriladigan kompetensiyalar matematika fanlarni o‘qitishda o‘quvchilarning ijodiy fikrlashini rivojlantirishda, yozma va og‘zaki ravishda o‘z qarashlarini ravon bayon etish malakalarini hosil qilishda, ilmiy atamalarni to‘g‘ri qo‘llash hamda bahs-munozaralar jarayonida erkin muloqot qilishga o‘rgatishda muhim o‘rin tutadi.

Iqtisodiy bilim asoslari fanini o‘rganish jarayonida iqtisodiyotni yanada rivojlantirish va liberallashtirishga yo‘naltirilgan makroiqtisodiy barqarorlikni mustahkamlash va yuqori iqtisodiy o‘sish sur’atlarini saqlab qolish, ijtimoiy-iqtisodiy faoliyat bilan bog‘liq bo‘lgan muayyan hayotiy vaziyatlarda eng maqbul yechim topa olish va to‘g‘ri qaror qabul qilishga o‘rgatishdan iborat. O‘quvchilarda iqtisodiy masalalarning matematik modelini qurish va matematika fani yordamida iqtisodiy jarayonlarni tahlil qilish, bashoratlar qilish ko‘nikmalarini rivojlantirish muhim ahamiyat kasb etadi.

Tadbirkorlik asoslari fanini o‘rganish o‘quvchilarning kelajakdagi hayotiy tadbirkorlik ko‘nikmalarini shakllantirishni ko‘zda tutadi. Tadbirkorlik faoliyatini rejalashtirishda matematikaning o‘rni beqiyos bo‘lib, tadbirkor mablag‘lari va sarmoyasini iqtisodiyotga jalb qilish maqsadida ishlab chiqadigan biznes reja matematik hisob-kitoblar yordamida asoslab berilishi lozim. Tadbirkor faoliyatida foyda, zarar va daromad hamda tavakkalchilik kabi muhim omillar borki, ular ham oldindan matematik hisob-kitoblar yordamida asoslanishni – tadbirkorlik faoliyatining samaradorligini kafolarlashda muhim o‘rin tutadi. Matematika darslarida iqtisodiy muammo va masalalarni yechish matematika fani mazmunini hayotiy masalalar bilan boyitadi va o‘quvchilarning fanlarga bo‘lgan qiziqishning oshishiga olib keladi.

Tarix fani matematika fani bilan ham bevosita bog‘langan. Ilm-fan yutuqlarining ishlab chiqarish sohalari, iqtisodiy-ijtimoiy munosabatlarining rivojlanishi va atrof-muhit holatiga ta’sirini ko‘rsatishda tarixiy ma’lumotlarning ahamiyati kattadir. O‘quvchilar tarixiy voqealarga doir ma’lumotlarni o‘tmish va hozirgi kunning mohiyatini anglatish maqsadida raqamli va grafik shaklda o‘rganish, izohlash, tahlil qilish va taqdim etishni o‘rganadilar. Xaritalarni tuzish va izohlashda o‘quvchilar kataklar, masshtab, masofa, maydon va proyeksiyalarni anglatuvchi sonli tushunchalar bilan ishlaydilar.

MATEMATIKADAN O‘QUVCHILAR YUTUQLARINI BAHOLASH ASOSLARI

Baholash

Baholash o‘quv jarayonining muhim va zaruriy tarkibiy qismi bo‘lib, u ta’limning joriy va yakuniy bosqichlarida o‘quvchilar faoliyati to‘g‘risidagi ma’lumotlarni to‘plash va tahlil qilishdan iborat.

Baholashning maqsadi, vazifalari, predmeti, obyekti, tamoyillari, usullari, shakllari va vositalari ta’lim jarayonining barcha subyektlari – maktab ma’muriyati, o‘qituvchilar, ota-onalar va o‘quvchilar uchun tushunarli bo‘lishi kerak.

Baholash tizimi bu – yutuqlarni o‘lchash va o‘quv muammolarini diagnostika qilishning asosiy vositasidir. U ta’lim sifatini, uning jahon standartlariga muvofiqligini aniqlashga, o‘qitish strategiyasi va taktikasi hamda ta’lim sohasidagi zamonaviy vazifalar, ta’lim mazmuni va kutilayotgan natijalarni baholovchi shakllarini takomillashtirish bo‘yicha asosiy qarorlarni qabul qilishga imkon beradi.

Baholash aslida olingan natijalar va rejalashtirilgan maqsadlarni o‘zaro bog‘lash jarayonidan iborat.

Baholash tizimi:

– o‘quvchining o‘quv materialini qay darajada muvaffaqiyatli egallaganligini yoki amaliy ko‘nikmalarni shakllantirganligini aniqlashga imkon berishi;

– kognitiv (o‘rganish) faoliyatning turli sohalarida o‘quvchilar muvaffaqiyatining dinamikasini (o‘zgarishini) ko‘rsatishi;

– o‘quvchilarni rag‘batlantiruvchi, rivojlantiruvchi, o‘z-o‘zini baholashga yordam beradigan mexanizmga asoslangan bo‘lishi;

– “o‘qituvchi va o‘quvchi”, “ota-ona va sinf rahbari”, “maktab ma’muriyat va o‘qituvchilar jamoasi” aloqalarini ta’minlashi lozim.

O‘quv maqsadlari – baholash asosi

Maktab amaliyotida, darsning ta’limiy, tarbiyaviy va rivojlantiruvchi maqsadlari ajratib ko‘rsatiladi. Tarbiyaviy va rivojlantiruvchi maqsadlarini bitta darsda amalga oshirish mumkin emas, ularning diagnostik jihatdan erishilganligini (hech bo‘lmaganda amaliyotda) aniqlash qiyin. Shuning uchun bugungi kunda ularni har bir dars uchun emas, balki darslar tizimi uchun rejalashtirish, ko‘p haftalarga mo‘ljallangan tematik rejada shakllantirish tavsiya qilinadi.Ular har bir darsda yo‘naltiruvchi vazifani bajaradi.

Tarbiyaviy va rivojlantiruvchi o‘quv maqsadlarini ta’lim standartlarida o‘quvchining amaliy faoliyati uchun mezon (etalon) lar shaklida ifodalashning imkoni yo‘qligi sababli, kelgusida mezonga asoslangan baholashda faqat o‘quv maqsadlari haqida fikr yuritiladi.

Dars maqsadlarini belgilash bo‘yicha yo‘riqlar

Dars maqsadlari o‘rganish jarayoni natijalarining o‘quvchilar faoliyatiga nisbatan ifodasida namoyon bo‘ladi. Maqsadlar aniq (konkret), korrekt va erishib bo‘ladigan tarzda ifodalanishi zarur.

Maqsadning aniqligi deganda umumiy tarzda ifodalashdan qochib, o‘quv maqsadini aniq va ravshan tavsiflash tushuniladi. Dars maqsadini aniqlashtirib olgan o‘qituvchi unga erishish uchun maqsadli o‘quv jarayonini tashkil qilib, ko‘p narsaga erishadi. Mavhum, umumiy tavsiflangan maqsadlar esa o‘qituvchining dars davomidagi xatti-harakarlariga yo‘naltiruvchi kuch bermaydi. Oqibatda dars natijasi kutilgandek bo‘lmasligi mumkin.

Maqsadning korrektligi deganda maqsadning ifodasi haqiqatan ham kutilayotgan natijaga qaratilganligi, ya’ni uning to‘g‘ri ifodalanganligi anglashiladi.

Maqsadlar vaqt, qanday o‘quv materialini qamrab olganligi va o‘quvchilarning o‘zlashtirish imkoniyatlari hamda shart-sharoitlardan kelib chiqib, erishib bo‘ladigan qilib belgilanishi muhim ahamiyat kasb etadi. Yuqorida ta’kidlanganidek, maqsadlar o‘quvchilar faoliyatiga nisbatan ifodalanishi kerak. Maqsadning bunday aniqlashtirilishi o‘quv natijalari haqidagi umumiy tasavvurdan ma’lum bir etalonga, o‘quvchi tomonidan erishilishi lozim bo‘lgan mezonga o‘tishga yordam beradi.

Dars maqsadlarini belgilash texnologiyasining tavsifi bilim, ko‘nikma, malaka, ijodiy faoliyat tajribasini rivojlantirishning mumkin bo‘lgan o‘zlashtirish darajalariga bog‘liqliklarisiz to‘liq bo‘lmaydi.

O‘zlashtirish darajalari

O‘zlashtirishning uchta darajasini ajratib ko‘rsatish mumkin.

1-daraja – bilish va tushunish (tanib olish faoliyati). O‘quvchilar uni obyektlar, jarayonlar yoki harakatlar haqida ilgari o‘zlashtirilgan ma’lumotlarni qayta idrok etgandagina amalga oshirishi mumkin.

2-daraja – qo‘llash (algoritm), ya’ni ilgari o‘rganilgan, reproduktiv, algoritmik harakatlarni qo‘llash. O‘quvchilar mazkur amalni bajarish bo‘yicha oldin o‘zlashtirgan ma’lumotlari asosida mustaqil ravishda uni qayta bajara oladilar.

3-daraja – mulohaza yuritish (ijodiy), ya’ni nostandart muammolarni hal qilish uchun ilgari olingan bilim va ko‘nikmalarni qo‘llash. Bu fikrlash uchun samarali harakatdir. Ushbu jarayon natijasida o‘quvchilar subyektiv (faqat o‘zlari uchun) yangi ma’lumotlarni o‘zlashtirishadi, ya’ni evristik faoliyatni amalga oshirishadi. Shuningdek, yangi ma’lumotlarni o‘zlashtirishadi. Bunda ular tadqiqotchilik faoliyatini amalga oshirib, o‘zlariga ma’lum bo‘lgan sohada “qoidalarsiz” harakat qilib, yangi boshqa qoidalarni yaratishadi.

Maqsadni belgilash faoliyati jarayonida o‘qituvchi ushbu darsning o‘rganish obyekti bo‘lgan mazmun elementlarini aniqlaydi, har bir element uchun standart talablar, vaqt miqdori, o‘quvchilarning xususiyatlarini hisobga olgan holda o‘zlashtirish darajasi va aniqlashtirilgan maqsadlarni belgilaydi hamda o‘quv maqsadlarini shakllantiradi va ularga erishish uchun zarur bo‘lgan harakat usullari va shakllarini tanlaydi.

Baholashning o‘quv maqsadlariga muvofiqligi

Ta’lim natijalarini tekshirish va baholash o‘quv maqsadlariga yo‘naltirilgan bo‘lishi kerak. Shuni aytish joizki, baholash mezonlari aynan ta’lim standartlari talablarining elementlaridan iborat bo‘lgan o‘quv maqsadlaridan kelib chiqib tuzilishi, baholash topshiriqlari esa maqsadga erishganlikni aniqlaydigan bo‘lishi lozim.

Baholashda mezonga asoslangan yangicha yondashuv

Mezonga yo‘naltirilgan ta’lim texnologiyasining asosiy jihati belgilangan standart va dastur talablariga muvofiq to‘liq o‘zlashtirishning belgilarini aniqlash va uning muayyan etalonini (mezonini) ifodalashdan iborat.

Mezonga yo‘naltirilgan ta’lim texnologiyasining asosi ilmiy asoslangan ta’lim maqsadlaridan iborat. O‘quvchilar tomonidan ongli qabul qilingan va anglangan ilmiy asoslangan o‘quv maqsadlari - o‘qituvchi va o‘quvchilar faoliyati mohiyatining yaqinlashishiga olib keladi, ta’limning shaxsga yo‘naltirilganligini ta’minlaydi.

Mezon (kriteriy)ga baholash o‘lchov vositasi, baholash nima asosida amalga oshirilayotganligini ko‘rsatuvchi belgi sifatida qarash mumkin.

Mezonlarga asoslangan baholash o‘quvchilarning turli sohalarda o‘qib-o‘rganish kompetensiyalarini rivojlantirish bo‘yicha erishgan yutuqlarini aks ettiruvchi tarkibiy qismlardan (mezonlardan) tashkil topgan baholardan iborat.

Mezonlarga asoslangan baholash bu –

baholash va o‘zini o‘zi baholashning har xil turlari, shakllari va usullaridan foydalanadigan yondashuvdir.

Mezonlarga asoslangan baholash tamoyillari

Mezonlarga asoslangan baholash tamoyillari quyidagilardan iborat:

– *ta’lim va tarbiya jarayoni bilan bog‘liqlik* – o‘lchov parametrlari ta’lim va tarbiya natijalariga qo‘yiladigan Davlat ta’lim standarti va o‘quv dasturlari talablari bilan belgilanishi;

– *dolzarblik* – eng muhim ta’lim va o‘quv faoliyatining natijalarini baholashga urg‘u berish;

– *xolislik va adolat* – bosim vositasi (yoki natijasi) bo‘lmagan aniq baholash mezonlarini sinchkovlik bilan tanlashni amalga oshirish;

– *adekvatlik* (muvofiqlik) – bilim, qobiliyatlarni, ko‘nikmalarni, qadriyatlarni, malakalarni baholashning maqsadlari va ta’lim natijalariga muvofiqligi;

– *integratsiya* – baholash o‘quv jarayonining ajralmas qismi; baholash mezonlari va strategiyalari ochiqligi va shaffofligining o‘quvchilarga oldindan yetkazilishi; o‘quvchilarning baholash mezonlarini ishlab chiqishda ishtirok etishlari.

– *ishonchlilik* – ishonchlilik darajasi ishonchlilik koeffitsiyenti (korrelyatsiya koeffitsiyenti) bilan belgilanadi, bu – bir xil sharoitda o‘tkazilgan baholash natijalari qay darajada bir-biriga mos kelishi;

– *samaradorlik* – maqsadlar va rejalarni ma’lum talablar: vaqt, xarajatlar, maqsadga erishish darajasi asosida amalga oshirish imkoniyati;

– *asoslilik (validlik)* – o‘rganilayotgan pedagogik hodisaning haqiqatan ham talab qilinadigan mezonlar (kriteriylar)ni o‘lchashga imkon berishi;

– *tizimlilik va izchillik* – baholash amaliyotlarining tizimli, izchil va davriy ravishda amalga oshirilishi; vaqti-vaqti bilan amalga oshiriladigan o‘lchovlarning birgalikda ayrim bo‘limlar uchun ham, butun mazmun uchun ham nazorat choralaridan iborat yaxlit tizimni ifodalashi;

– *keng qamrovlilik (komplekslik)* – funksional savodxonlikni shakllantirish vazifasi mavzu mazmunini o‘zlashtirish natijalarini o‘lchashni, asosiy vakolatlarni shakllantirishni talab qiladi.

– *xayrixohlik* – o‘qituvchi va o‘quvchi o‘rtasida sheriklik holatini yaratish, yutuqlarning o‘sishini rag‘batlantirish; o‘quvchilarni rivojlantirish va qo‘llab-quvvatlashga e’tibor qaratish.

Mezonga asoslangan baholashda o‘qituvchi uchun yo‘riqlar ham o‘zgaradi:

– o‘quvchining shaxsiyati emas, faqat uning ishi baholanishi kerak;

– o‘quvchining ishi – sinfda vazifani yaxshi bajargan o‘quvchilarning ishlari bilan emas, balki oldindan belgilangan va o‘quvchiga oldindan ma’lum bo‘lgan etalon (standart) bilan taqqoslanadi;

– aniq vazifalarning turli shakllaridan foydalaniladi (risoladagidek bajarilgan vazifalarning aniq tavsiflari mavjud);

– baholashning (baho chiqarishning) aniq algoritmi ishlab chiqiladi, unga ko‘ra, o‘quvchi o‘zi erishgan darajasi va tegishli bahoni o‘zi aniqlashi mumkin;

– o‘quvchilar o‘zlarini baholashga o‘tishga intilib, baholash jarayonida qatnashadilar;

– faqat o‘qitiladigan narsa baholanadi, shuning uchun baholash mezonlari ta’lim maqsadlarining o‘ziga xos ifodasidir;

– fan bo‘yicha umumiy ta’lim maqsadlari o‘quvchilarning ushbu fan bo‘yicha erishgan yutuqlarini baholash mezonlari bo‘lib, o‘quvchilarning individual ishlari bilan aniqlangan natijalarni umumlashtirishga imkon beradi.

Formativ va summativ baholash

Mezonga asoslangan baholash tizimi formativ (shakllanuvchi) baholash yoki joriy baholash va summativ (jamlanuvchi)

yoki oraliq (yakuniy) baholashni o‘z ichiga oladi. Summativ baholashga o‘quv dasturi bo‘limlari tugaganda, chorak va yil oxirida o‘tkaziladigan oraliq va yakuniy baholashlar kiradi.

Formativ baholash sinfda yoki uydagi ta’lim olish jarayonida bilim va ko‘nikmalarni o‘zlashtirish darajasini aniqlashga mo‘ljallangan. U har xil shakllarda olib boriladi hamda o‘qituvchi va o‘quvchiga o‘z faoliyatlarini tuzatishga, yuzaga kelishi mumkin bo‘lgan muammo va kamchiliklarni bartaraf etishga imkon beradi. Fotmativ baholar summativ, choraklik va yakuniy baholarni chiqarishda hisobga olinmaydi.

Summativ baholash fanning yaxlit o‘quv bo‘limi mavzularini o‘rganish tugaganidan so‘ng shakllanishi lozim bo‘lgan bilim va ko‘nikmalarning o‘zlashtirilganlik darajasini aniqlash uchun mo‘ljallangan.

Summativ baholash testlar, nazorat ishi, loyiha ishi kabi baholash ishlarini bajarish natijalari bo‘yicha amalga oshiriladi. Summativ baholash uchun qo‘yilgan baholar fan bo‘yicha choraklik, yillik yakuniy baholarni belgilash uchun asos bo‘ladi.

Summativ baholash mezon asosida amalga oshiriladi. Baholash mezonlari haqida o‘quv jarayonining barcha ishtirokchilari: o‘quvchilar, o‘qituvchilar, ota-onalarning oldindan xabarlari bo‘lishi lozim.

Baholash mezonlari formativ baholashning ham ajralmas qismidir. Formativ baholashda baholash mezonlari o‘quv materialining (mavzu yoki bo‘limning) ma’lum bir qismiga yo‘naltirilgan bo‘lsa, summativ baholashda ular keng miqyosda qaraladi.

Mezonga asoslangan baholash mexanizmi

O‘qituvchi bajarilgan joriy ish uchun olingan bahoni sinf jurnaliga va o‘quvchining kundaligiga qo‘yadi. Ushbu baho, yuqorida aytib o‘tilganidek, o‘qituvchi uchun ham, o‘quvchi uchun ham ma’lumot beradi. Sinfda formatriv baholashdan foydalanganda o‘qituvchi o‘zining shaxsiy daftariga o‘quvchilar yutuqlarini turli qulay belgilar, piktogramma, ranglar, sharhlar shaklida qayd etib borishi ham mumkin. Bu bilan o‘qituvchi har bir o‘quvchining kamchiliklari va ularni tuzatish yo‘llari, shuningdek, belgilangan o‘quv maqsadlari bilan bog‘liq holda ular rivojlanishining o‘zgarish dinamikasini kuzatib boradi.

Baholashning turli shakllari mavzuviy rejalashtirishda aks ettirilishi kerak. O‘qituvchi chorak boshlanishidan oldin chorak davomida o‘tkazilishi lozim bo‘lgan baholashni rejalashtirishi kerak.

O‘qituvchi baholashni tashkil qilish uchun:

- baholash turlarini belgilaydi;
- baholash shakllarini ishlab chiqadi;
- baholash mezonlarini tuzadi;
- nazorat ishlari vaqtini belgilaydi.

O‘quvchilarning o‘quv-o‘rganish faoliyatini baholash bo‘yicha barcha ma’lumotlarni to‘plash va saqlash, olingan ma’lumotlarni tahlil qilish zarur. Tahlillar har bir o‘quvchining o‘rganish faoliyati va butun sinfning o‘zlashtirish dinamikasini o‘rganish maqsadida o‘tkazilishi shart.

Formativ baholashda ishning mazmuni va to‘g‘riligi yozma yoki og‘zaki qayd qilib boriladi. Natijalar dastlab jurnalga qo‘yilmasligi mumkin. Bu holatda ular o‘quvchi bilan muhokama qilinadi va o‘qituvchining alohida tutgan daftariga qo‘yiladi. O‘quvchilar o‘qituvchining bu sharhlari asosida ishlarini qayta ko‘rib chiqadilar va xatolarini tuzatadilar. Shundan so‘nggina aniqlashtirilgan baholar jurnalga qo‘yilishi mumkin.

Mavzular blogi yoki bobni o‘rganish tugagandan so‘ng o‘qituvchi summativ baholashni amalga oshiradi. Bunday ish endi baholash mezonlari yordamida amalga oshirilishi lozim bo‘ladi. Chorak davomida o‘qituvchi nazorat ishlari sonini rejalashtirishi kerak. Summativ baholashlar soni chorak davomida kamida ikkita bo‘lishi maqsadga muvofiq. Ushbu nazorat ishlari o‘quvchilarning berilgan mavzular blogi bo‘yicha bilim va ko‘nikmalarini baholash bo‘yicha tuzilgan topshiriqlardan iborat

bo‘ladi. Nazorat ishlari standart talablar asosida o‘rganilgan bob mavzularining mazmunini iloji boricha to‘liq qamrab olishi shart. O‘qituvchi topshiriqlarni shunday tanlashi kerakki, ular faqat nazariy materialni o‘zlashtirish, ya’ni bilim darajasini emas, balki o‘quvchining o‘zlashtirgan bilimlarini qo‘llash darajasini ham tekshirishi lozim. Shuningdek, o‘quvchilar uchun mulohaza yuritishga doir uchinchi darajali topshiriqlarni taklif etish lozim bo‘ladi. Nazorat ishlari natijasida olingan baholar keyingi darsda xatolar ustida ishlagandan so‘ng tuzatishlar bilan jurnalga qo‘yiladi.

Choraklik yakuniy baho o‘rtacha formativ va summativ baholar arifmetigi sifatida chiqariladi. Yillik yakuniy baho sifatida 4 ta choraklik baholar va loyiha ishi bahosining o‘rtachasi olinadi. Agar yil oxirida fan bo‘yicha imtihon (yoki yakuniy nazorat) ham ko‘zda tutilgan bo‘lsa, yillik baho sifatida choraklik baholar, loyiha ishi bahosining o‘rtachasi va imtihon (yoki yakuniy nazorat) bahosining o‘rta arifmetigi tanlab olinadi.

Summativ baholash topshiriqlari

Summativ baholashni ta’lim muassasasi ma’muriyati tuzgan komissiya tomonidan xolisona o‘tkazish tavsiya etiladi. Baholash muddatlari, mezonlari, topshiriqlar namunalari va baholash bo‘yicha yo‘riqlar oldindan tuzilib, o‘quvchilar va ularning ota-onalariga hamda dars beruvchi o‘qituvchilarga o‘quv yili boshida e’lon qilinishi lozim.

Summativ baholash ikki qismdan iborat bo‘lishi mumkin:

– *test topshirig‘i;*

– *yozma ish.*

Summativ baholashda 100 ballik tizim qo‘llanadi va tarkibiy qismlari bo‘yicha ballar quyidagicha taqsimlanadi:

– *test topshirig‘i – 30 ball;*

– *yozma ish – 70 ball.*

Test topshirig‘i 45 minutga mo‘ljallangan bo‘lib, 15 – 25 ta testdan iborat qilib tuziladi.

Topshiriq quyidagi test turlaridan iborat bo‘lishi mumkin:

– to‘rtta javob variantli, bitta to‘g‘ri javobli yopiq test;

– to‘rttadan ko‘p javob variantli, bir nechta to‘g‘ri javobli yopiq test;

– to‘rtta savolga to‘rtta to‘g‘ri javobni mos qo‘yadigan yopiq test;

– har biriga “to‘g‘ri” yoki “noto‘g‘ri” deb javob beriladigan, to‘rtta savoldan iborat yopiq test;

– qisqa javobli ochiq test (faqat javobini yozish so‘raladigan masala yoki savol). Test topshirig‘i odatda o‘quvchilarning 1- va 2-darajadagi o‘zlashtirish darajasiga erishganligini aniqlash uchun o‘tkaziladi. Shunga mos ravishda har bir test savoli 1 yoki 2 ball bilan baholanadi.

Yozma ish esa batafsil javobli ochiq test, ya’ni batafsil yechishga mo‘ljallangan to‘laqonli matematika masalalaridan iborat qilib tuziladi. Yozma ish odatda 45 minutga mo‘ljallangan bo‘lib, u quyidagi mazmundagi 3 ta masaladan iborat qilib tuzilishi tavsiya etiladi:

– algebraga doir algoritm asosida yechiladigan masala yoki geometriyadan hisoblashga doir masala;

– algebraik mulohaza yuritish yoki geometriyadan isbotlashga doir masala;

– hayotiy vaziyatga doir muammoning matematik modelini tuzish va uni yechishga doir masala.

Yozma ish odatda o‘quvchilarning 2- va 3-darajadagi o‘zlashtirish darajasiga erishganligini aniqlash uchun o‘tkaziladi. Yozma ishni baholash mezonlari uning har bir masalasi uchun alohida tuziladi va ballar masalalarning murakkablik darajasidan kelib chiqib o‘zaro taqsimlanadi.

Ballarni bahoga o‘tkazish shkalasi

– 0 dan – 50 ballgacha – “2” baho;

– 51 dan – 70 ballgacha – “3” baho;

– 71 dan – 85 ballgacha – “4” baho;

– 86 dan – 100 ballgacha – “5” baho.

Loyiha ishini baholash mezonlari

Loyiha ishi haqida yuqorida batafsil ma’lumot berildi. O‘quvchilarning loyiha ishi bo‘yicha faoliyati birgalikda baholanadi. Loyiha ishi ham 100 balli tizimda baholanadi va yuqoridagi shkala yordamida baholarga o‘tkaziladi. Har bir o‘quvchiga loyiha ishi uchun qo‘yilgan umumiy baho qo‘yiladi. Quyida loyiha ishini baholash mezonlari va ularga mos maksimal ballar keltirilgan:

№	Baholash mezonlari	Ballar
1	Loyiha ishida o‘rganilgan muammolarning ahamiyatliligi va dolzarbligi hamda o‘rganilayotgan mavzuga mosligi	5
2	Tuzilgan matematik modelning o‘rganilayotgan muammoga mosligi	10
3	Foydalanilgan tadqiqot metodlari va olingan natijalarni qayta ishlash usullarining muammoni o‘rganishga muvofiqligi	20
4	Muammoga zaruriy va yetarlicha chuqur kirib borganlik; boshqa sohalardan bilimlarni jalb etish imkoniyatlaridan foydalanganlik	20
5	Oraliq va yakuniy xulosalarning asoslanganligi, natijalarning muammo yechimiga yaqinligi	10
6	Loyiha ishtirokchilarining hamkorlikdagi faolligi	10
7	Bajarilgan loyiha natijalarini rasmiylashtirish sifati	5
8	Taqdimot sifati, taqrizchilar savollariga javob bera olish, guruhning har bir ishtirokchisi javoblarining asoslanganligi	20
Jami		100

2.4 GEOMETRIYA DARSLARIDA TARIXIY–ILMIY MEROS-NING O‘RNI

Respublikamizning kelajagi bo‘lmish yosh avlodga hozirgi zamon fanining yangiliklari, uning murakkab qirralari o‘rgatish bilan bir qatorda, o‘tmish merosimizni ham o‘rgatish lozim.

Dars jarayonlarida al-Xorazmiy, Abu Nasr Farobiy, Ahmad al-Farg‘oniy, Abu Ali ibn Sino, Abu Rayhon Beruniy, Abul Vafo Buzjoniy, G‘iyosiddin al-Koshiy, Umar Xayyom, Nosiruddin at-Tusiy, Mirzo Ulug‘bek kabi buyuk allomalarning va hozirgi zamon mashhur o‘zbek matematiklarining matematika faniga qo‘shgan hissalari haqida tushuncha berish maqsadga muvofiqdir.

Matematika darslarida tarixiy ma’lumotlardan foydalanish matematika darslarini qiziqarli qiladi, o‘quvchilarning o‘rganilayotgan materiallarga qiziqishini orttiradi, bilimlarni mustahkam egallashlariga yordam beradi.

Tarixiy materiallardan foydalanishning ikki asosiy usuli mavjud: tarixiy materiallardan dars jarayonida foydalanish va ulardan darsdan tashqari ishlarni tashkil etishda foydalanish. Geometrik faktlarni hozirgi zamon faktlari bilan taqqoslash yoki tarixiy masalalar yechish geometriyaning har bir darsiga to‘g‘ri kelavermaydi, ammo dars jarayonida tarixiy fakrlarga tez-tez murojaat qilib turiladi. Ammo bularning hammasi o‘quvchilarni o‘rganilayotgan asosiy mavzudan chalg‘itmasligi kerak.Tarixiy masalalardan darsning boshi yoki oxirida foydalangan ma‘qul. Agar o‘qituvchi o‘z sinfiga ishonsa, unda dars davomida ham foydalansa bo‘ladi.

O‘quvchilardan hamma aytilgan tarixiy faktlar, ismlar va yillarni esda saqlashni talab etish shart emas. Darsda ular muammo yoki masalaning qisqacha tarixi bilan tanishishlari, biror kashfiyot ro‘y bergan davrni esga olishlari, yangilik qilgan matematikning ismini eshitishlari, agar bo‘lsa, portretini ko‘rishlari kifoya. Bu aytilganlarning hammasi bo‘lmasa-da, bir qismi ularning esida qoladi va o‘qituvchi u o‘qitadigan “fanning quruqligi” haqidagi da’vodan qutuladi, darsning esa anchagina qiziqarli bo‘lishiga erishadi.

Geometriyaning kelib chiqishi

Geometriya dastlab Qadimgi Misr va Bobilda shakllanib, keyinchalik Qadimgi Gretsiyada (Yunonistonda) rivojlandi. Umuman, geometriyaning paydo bo‘lishi va rivojlanishi insoniyat taraqqiyoti bilan chambarchas bog‘liqdir. Uning aynan yuksak sivilizatsiyaga ega bo‘lgan davlatlarda shakllanishi va rivojlanishi ham fikrimizni tasdiqlaydi. Mashhur yunon tarixchisi Gerodot (miloddan avvalgi V asr) geometriyaning paydo bo‘lishi haqida shunday deydi: “Misr shohi Seotros har bir misrlikka qur’a bo‘yicha yer maydoni ajratib berar va yer egasidan shu yerga mos soliq undirar edi. Agar Nil daryosi toshib biror kishining yerini yuvib ketsa, u podshoga xabar berar va podsho tanobchilar yuborib, u kishining yeri qanchaga kamayganligini aniqlatar hamda unga mos ravishda soliqni ham kamaytirar edi. Geometriya mana shunday paydo bo‘lgan va so‘ngra Gretsiyaga o‘tgan”.

Bu haqda grek olimlaridan Yevdem (miloddan avvalgi IV asr) bunday yozadi: “Geometriyani misrliklar kashf etgan, u yer o‘lchash natijasida vujudga kelgan. Bu o‘lchashlar doim yerlarning chegarasini yuvib ketadigan Nil daryosining toshqinlari tufayli hosil bo‘lgan. Bu fan ham boshqa fanlar singari, kishilarning ehtiyoji tufayli vujudga kelgan”.

Demak, geometriyani insoniyatning ehtiyoji vujudga keltirgan, ya’ni ular to‘g‘ri chiziqlar o‘tkazishlari, maydonlarning yuzini hisoblashlari, buyumlarning hajmini aniqlashlari zarur bo‘lgan.

Qadimgi misrliklar bir necha yillar davomida asta-sekin turli sohalarda ilmiy ma’lumotlar to‘play boshlagan. Ular ba’zi bir figuralarning yuzlarini, ba’zi jismlarning hajmlarini juda aniq hisoblay olar, ba’zi masalalarning yechish usullarini ham bilishar

edilar. Biroq fan sifatidagi geometriya hali ularda mavjud emas edi. Ularda o‘zaro bog‘lanmagan, tartibsiz holdagi juda ko‘p qoidalar mavjud edi.

Miloddan avvalgi VII asr o‘rtalarida Kichik Osiyoning g‘arbiy chegaralari Gretsiyaga qarar edi. Uning o‘rta qismi Ioniya deb atalar, Ioniyada boshqa mamlakatlar bilan savdo-sotiq ishlarini olib boruvchi katta-katta shaharlar juda ko‘p edi. Shunday shaharlardan biri Miletda faylasuf va matematik Fales (miloddan avvalgi 640 – 548) yashagan. U Misrga sayohat qilgan va u yerda turli fanlar bilan tanishgan. Falesni ko‘proq geometriya qiziqtirgan. U Ioniya maktabining asoschisi hisoblanadi. Fales geometriyaga tegishli juda ko‘p kashfiyotlar qilgan. Shuning uchun ham Fales fan tarixida birinchi geometrik olim sifatida tan olinadi.

Misr va Yunoniston o‘rtasida savdo-sotiq ishlari rivojlangan bo‘lib, savdogarlar bilan birga yunon olimlari ham Misrga safar qilib turishgan va misrliklarning turli fanlar sohasida erishgan yutuqlarini o‘rganib qaytishgan. Ular misrliklarning matematika va boshqa fanlardagi bilimlarini faqat o‘rganish bilan chegaralanmasdan, ulardagi kamchiliklarni tuzatib, tartibga solib, nazariy jihatdan to‘ldirib, yaxlit holga keltirishdi. Natijada bundan taxminan 2500 yillar ilgari Yunonistonda geometriya fan sifatida shakllandi.

Shunday qilib, o‘sha davrda Yunonistonda geometriya rivojlana boshladi. Miloddan avvalgi V asrda Gippokrat geometriyadan to‘plangan barcha bilimlarni bitta kitobda sistemali ravishda bayon etishga urinib ko‘rdi. Uning bu asari bizgacha yetib kelmagan.

Miloddan oldingi III asrda Yevklid bu ishni muvaffaqiyatli amalga oshirdi va geometriyaning mustaqil matematik fan sifatida shakllanishiga ulkan va beqiyos hissa qo‘shdi. U o‘zining mashhur “Negizlar” asarida boshlang‘ich tushunchalar va asos sifatida ba’zi aksiomalar va postulatlarni oldi va ulardan mantiqiy yo‘l bilan teoremalarni keltirib chiqardi.

5–6-sinflarda o‘quvchilar geometriyaning ba’zi elementlari bilan tanishgan bo‘lsalar, 7-sinfda bu fanni sistemali ravishda o‘rganishni boshlaydilar.

Geometriyaning eng sodda tushunchalari, son tushunchasi singari, kishilarning ehtiyoji tufayli vujudga kelgan. Dastlabki geometrik o‘lchov birliklari inson tanasining biror a’zosi bilan bog‘liq bo‘lgan (masalan, “qarich”, “qadam”, “tirsak” va hokazo).

Mamlakatimiz hududida olib borilgan arxeologik qazish ishlari geometriyaning dastlabki rivojlanishi dehqonchilik, kulolchilik, tikuvchilik ishlari, qurilish va uning texnikasi bilan bog‘liq ekanini ko‘rsatadi. Qazish paytida topilgan turli sopol idishlar, ularga ishlangan turli-tuman shakllar qadimgi ajdodlarimiz geometriyadan ancha boxabar ekanligidan dalolat beradi. Ular o‘z turarjoylarini turli xil geometrik shakllar – uchburchaklar, ko‘pburchaklar va spirallar bilan bezatganlarini ko‘ramiz. O‘sha bezaklarda figuralarning tengligi, o‘xshashligi, simmetriyasi va hokazolar uchraydi. Shuni alohida ta’kidlash kerakki, qadimgi xalqlarda uchraydigan bunday shakllar bevosita tabiatdan olingan.

O‘rta asrlarga kelib Sharqda ilm-fan yuksak taraqqiy etdi. Xususan, geometriya fani ham yangi kashfiyotlar bilan boyitilib, rivojlana boshladi. Bunda, albatta, O‘rta Osiyodan yetishib chiqqan buyuk olimlarimizning xizmatlari juda kattadir. Al-Xorazmiy, Ahmad al-Farg‘oniy, Abu Nasr Farobiy, Abul Vafo Buzjoniy, Abu Rayhon Beruniy, Abu Ali ibn Sino, G‘iyosiddin Jamshid al-Koshiy, Mirzo Ulug‘bek va boshqa olimlarning ilmiy merosi, hayot yo‘llari haqida, jumladan, geometriyaning rivojiga qo‘shgan hissalari haqida o‘quvchilarimiz zarur ma’lumotlarga ega bo‘lishlari kerak. Bu haqda bilim berish, tushuntirish ma’naviy yetuk, bilimdon, buyuk ajdodlari bilan faxrlanuvchi va ularga munosib voris bo‘lishga intilayotgan barkamol yosh avlodni tarbiyalashda muhim ahamiyatga ega.

I BOB. GEOMETRIYANING BOSHLANG‘ICH TUSHUNCHALARI

ENG SODDA GEOMETRIK SHAKLLAR (2 soat)

1-DARS

I. Standartlar:

M7.GO‘.GSH.01. Geometriya fanining vujudga kelish tarixini biladi va fanning maqsad-vazifalarini tushunadi, tegishli misollar keltira oladi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– geometriya fanining vujudga kelish tarixini bilish;
– fanning maqsad-vazifalarini tushunish.

Ko‘nikmalar:

– geometriya fani tarixiga doir misollar keltira olish;

III. Dars mazmunining qisqacha tavsifi:

– geometriya fanining vujudga kelishi;
– geometriya fanining maqsad va vazifalari;
– planimetriya va stereometriya.

IV. Dars ashyolari va ko‘rgazmali qurollar:

– g‘isht (1 dona);
– turli yassi va fazoviy geometrik shakllar modellari.

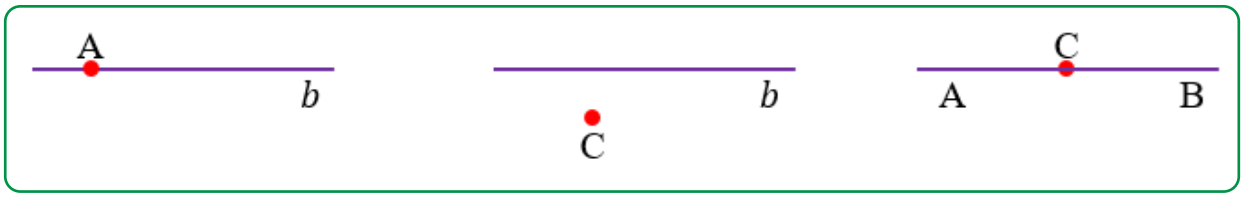
V. Darsning qisqa texnologik xaritasi:

Dars bosqichlari	Tafsilotlari	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	“Geometriya” so‘zining ma’nosi nima?	“Aqliy hujum”	Mavzu bo‘yicha savollar: (2)
Bilimlarni boyitish va mustahkamlash	Geometriya fanining vujudga kelishi	Darslik bilan ishlash	1. Mavzu bo‘yicha savollar: (1, 3) 2. Amaliy mashq va tatbiq: (1, 2)

	Geometriya fanining maqsad va vazifalari	G‘ishtning nechta uchi, yog‘i va qirrasi bor?	1. Mavzu bo‘yicha savollar: (4) 2. Amaliy mashq va tatbiq: (3, 4)
	Planimetriya va ste-reometriya	5-, 6-rasmlar bilan ishlash	1. Qanday geometrik shakllarni bilasiz? Ular nimasi bilan farq qiladi? 2. Mavzu bo‘yicha savollar: (5) 3. Amaliy mashq va tatbiq: (-5, 6)
Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	
Uyga vazifa	1. Mavzu bo‘yicha savollar: (7, 8 va 9) 2. Amaliy mashq va tatbiq: (7, 8)		

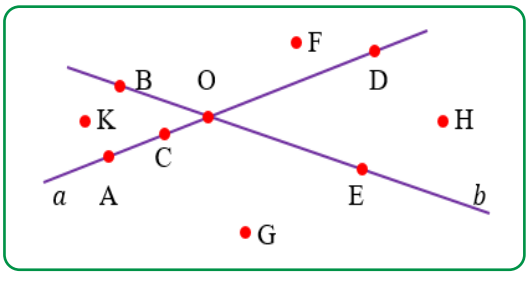
Masalalar, yechimlari va ularga doir ko‘rsatmalar

1. Quyidagi ifodalarni o‘qing va izohlang: a) $A \in b$; b) $C \notin b$; c) $C \in AB$. Bu ifodalarga mos chizmalarni chizing.



a) $A \in b$: A nuqta b to‘g‘ri chiziqqa tegishli;
b) $C \notin b$: C nuqta b to‘g‘ri chiziqqa tegishli emas;
c) $C \in AB$: C nuqta AB to‘g‘ri chiziqqa tegishli.

2. Ikkita kesishuvchi to‘g‘ri chiziq chizing. a) ularning har ikkisiga tegishli; b) faqat bittasiga tegishli; d) birortasiga ham tegishli bo‘lmagan nuqtalarni belgilang. Kiritilgan belgilar yordamida bu munosabatlarni yozing.

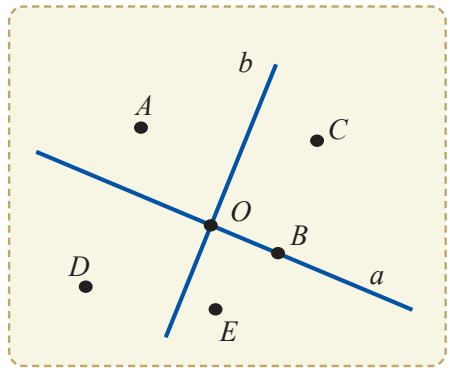


a) $\begin{cases} O \in a \\ O \in b \end{cases}$ Kesishuvchi to‘g‘ri chiziqlarning har biriga tegishli nuqta ularning kesishish nuqtasidir va u bittadir.

b) $A \in a$; $C \in a$; $D \in a$; $B \in b$; $E \in b$. A, C, D nuqtalar faqat a to‘g‘ri chiziqqa tegishli. B va E nuqtalar faqat b to‘g‘ri chiziqqa tegishli.

d) $F \notin a$; $H \notin a$; $G \notin a$; $K \notin a$. $F \notin b$; $H \notin b$; $G \notin b$; $K \notin b$. F, H, G, K nuqtalar a to‘g‘ri chiziqqa ham, b to‘g‘ri chiziqqa ham tegishli emas.

3. Rasmdan imkoni boricha ko‘proq nuqta, to‘g‘ri chiziq, tekislik va yarim-tekisliklar orasidagi munosabatlarni aniqlang va ularni kiritilgan belgilar yordamida yozing.

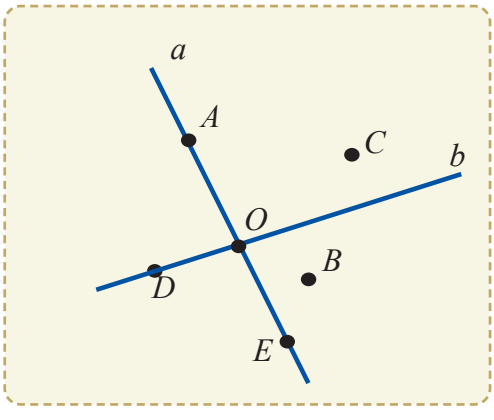


a) $\begin{cases} O \in a \\ O \in b \end{cases}$ O nuqta a to‘g‘ri chiziqqa ham, b to‘g‘ri chiziqqa ham tegishli, ya’ni ularning kesishish nuqtasidir.

b) $B \in a \rightarrow$ B nuqta faqat a to‘g‘ri chiziqqa tegishli.

d) $\begin{cases} A \notin a \\ A \notin b \end{cases}$; $\begin{cases} C \notin a \\ C \notin b \end{cases}$; $\begin{cases} D \notin a \\ D \notin b \end{cases}$; $\begin{cases} E \notin a \\ E \notin b \end{cases}$ $A;\ C;\ D;\ E$ nuqtalar a to‘g‘ri chiziqqa ham b to‘g‘ri chiziqqa tegishli emas.

4. Rasmdan a) a to‘g‘ri chiziqqa tegishli; b) b to‘g‘ri chiziqqa tegishli; d) har ikkala to‘g‘ri chiziqqa tegishli; e) a to‘g‘ri chiziqqa tegishli, lekin b to‘g‘ri chiziqqa tegishli bo‘lmagan; f) b to‘g‘ri chiziqqa tegishli, lekin a to‘g‘ri chiziqqa tegishli bo‘lmagan; g) a to‘g‘ri chiziqqa ham, b to‘g‘ri chiziqqa ham tegishli bo‘lmagan nuqtalarni aniqlang.



a) $A \in a;\quad O \in a;\quad E \in a.$ $A,\ O,\ E$ nuqtalar a to‘g‘ri chiziqqa tegishli.

b) $D \in b;\quad O \in b.$ D va O nuqtalar b to‘g‘ri chiziqqa tegishli.

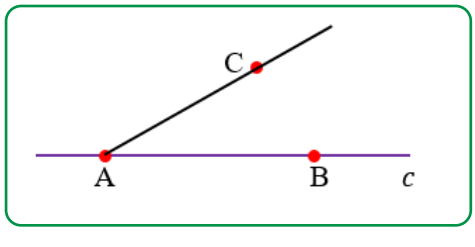
d) $\begin{cases} O \in a \\ O \in b \end{cases}$ $\rightarrow$ O nuqta a to‘g‘ri chiziqqa ham, b to‘g‘ri chiziqqa ham tegishli.

e) $\begin{cases} A \in a \\ A \notin b \end{cases}$; $\begin{cases} E \notin a \\ E \notin b \end{cases}$ $A; E$ nuqtalar a to‘g‘ri chiziqqa tegishli, b to‘g‘ri chiziqqa tegishli emas.

f) $\begin{cases} D \in b \\ D \notin a \end{cases}$ D nuqta b to‘g‘ri chiziqqa tegishli, a to‘g‘ri chiziqqa tegishli emas.

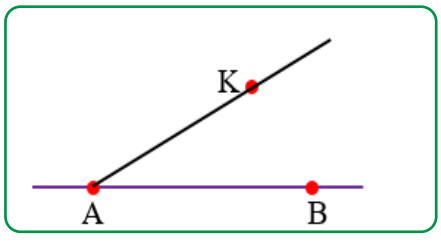
g) $\begin{cases} B \notin a \\ B \notin b \end{cases}$; $\begin{cases} C \notin a \\ C \notin b \end{cases}$ B va C nuqtalar a to‘g‘ri chiziqqa ham, b to‘g‘ri chiziqqa ham tegishli emas.

5. A va B nuqtalar c to‘g‘ri chiziqqa tegishli, C nuqta esa c to‘g‘ri chiziqqa tegishli emas. AB va AC to‘g‘ri chiziqlar haqida nima deyish mumkin?



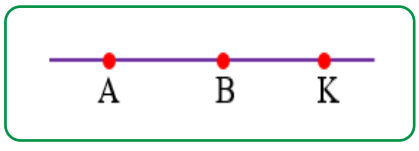
$A \in c,\ B \in c,\ C \notin c.$ AB va AC to‘g‘ri chiziqlar c to‘g‘ri chiziqdagi A nuqtada kesishadi, ya’ni A nuqta AB ga ham, AC ga ham tegishli.

6. AB va AK to‘g‘ri chiziqlar nechta umumiy nuqtaga ega bo‘lishi mumkin?



AB va AK to‘g‘ri chiziqlarda A nuqta ham AB ga, ham AK ga tegishli bo‘lgani uchun A nuqtadan chiquvchi ikkita kesma:

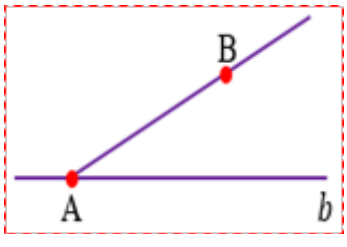
a) agar B, A, K nuqtalar bir to‘g‘ri chiziqda yotmasa, bitta umumiy A nuqtaga ega;



b) agar A,B,K nuqtalar bir to‘g‘ri chiziqda yotsa, AB va AK lar cheksiz ko‘p umumiy nuqtaga ega.

Uyga vazifa

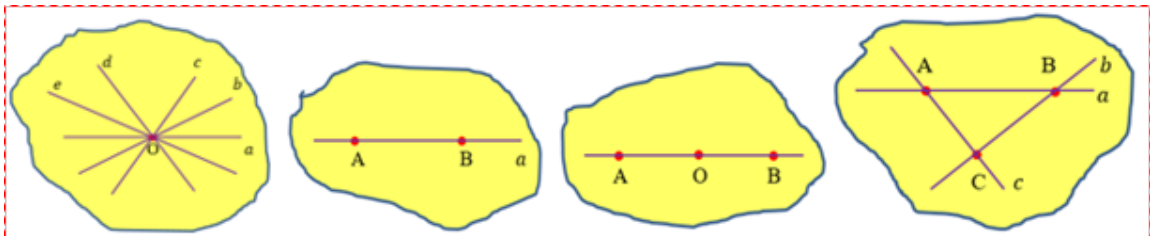
7. Tekislikda b to‘g‘ri chiziq chizing va unda A nuqtani belgilang. b to‘g‘ri chiziqdan farqli AB to‘g‘ri chiziqni o‘tkazing. B nuqta b to‘g‘ri chiziqda yotadimi?



AB to‘g‘ri chiziq va b to‘g‘ri chiziqlar farqli bo‘lishi uchun ustma-ust tushmasligi kerak. $\begin{cases} A \in b \\ A \in AB \end{cases} \rightarrow B$ nuqta b to‘g‘ri chiziqqa tegishli bo‘lmaydi.

Javob: yotmaydi.

8. Tekislikda yotgan ixtiyoriy a) bitta; b) ikkita; c) uchta nuqtadan o‘tuvchi nechta to‘g‘ri chiziq o‘tkazish mumkin? Javobingizni asoslang.



1-rasm 2-rasm 3-rasm 4-rasm

Tekislikda yotgan ixtiyoriy bitta nuqtadan o‘tuvchi cheksiz ko‘p to‘g‘ri chiziq o‘tkazish mumkin *(1-rasm)*.

Tekislikda yotgan ixtiyoriy ikkita nuqtadan o‘tuvchi bitta va faqat bitta to‘g‘ri chiziq o‘tkazish mumkin *(2-rasm)*.

Tekislikda yotgan ixtiyoriy uchta nuqta bir to‘g‘ri chiziqda bo‘lsa, ular orqali bitta to‘g‘ri chiziq o‘tkazish mumkin *(3-rasm)*.

Tekislikda yotgan ixtiyoriy uchta nuqta bir to‘g‘ri chiziqda yotmasa, ular orqali uchta to‘g‘ri chiziq o‘tkazish mumkin *(4-rasm)*.

2-DARS

I. Standartlar:

M7.GO‘.GSH.02. Geometriyaning boshlang‘ich tushunchalari mohiyatini tushunadi, eng sodda shakllarni biladi, ularning asosiy xossalarini tushunadi, tegishli misollar keltira oladi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– geometriyaning boshlang‘ich tushunchalari mohiyatini tushunish;
– eng sodda geometrik shakllarni bilish va ularning asosiy xossalarini tushunish.

Ko‘nikmalar:

– yassi geometrik shakllarga misollar keltira olish.

III. Dars mazmunining qisqacha tavsifi:

– geometriyaning boshlang‘ich tushunchalari;
– nuqta va to‘g‘ri chiziq.

IV. Dars ashyolari va ko‘rgazmali qurollar:

V. Darsning qisqacha texnologik xaritasi:

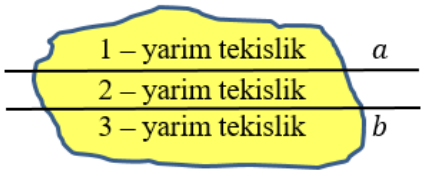
Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Nuqta, to‘g‘ri chiziq va tekislik nima?	“Aqliy hujum”	Mavzu bo‘yicha savollar
Bilimlarni boyitish va mustahkamlash	Geometriyaning boshlang‘ich tushunchalari: nuqta, to‘g‘ri chiziq va tekislik hamda ularning tasvirlanishi va belgilanishi		1. Mavzu bo‘yicha savollar. 2. Amaliy mashq va tatbiq: (9, 10)
	Asosiy geometrik shakllar va ularning xossalari	Darslikdagi 3 ta asosiy xossa atrofida suhbat qurish	1. Mavzu bo‘yicha savollar. 2. Amaliy mashq va tatbiq: (11, 12).
Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	
Uyga vazifa	1. Darslikda berilgan yoyilmalardan foydalanib to‘g‘ri burchakli parallelepiped, kub va piramidalar modellaridan birini yasash. 2. “Nilni jilovlagan farg‘onalik alloma” lavhasini o‘qib kelish. 3. Mavzu bo‘yicha savollar: - 4. Amaliy mashq va tatbiq (13, 14)		

Masalalar, yechimlari va ularga doir ko‘rsatmalar

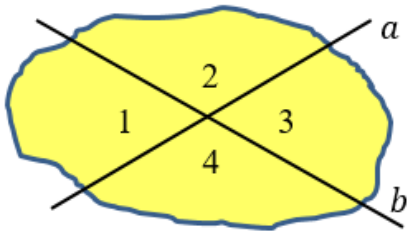
9. Tekislikni: a) bitta to‘g‘ri chiziq nechta yarim tekislikka; b) ikkita to‘g‘ri chiziq nechta bo‘lakka ajratadi?



a) Tekislikni bitta to‘g‘ri chiziq ikkita yarimtekislikdan iborat bo‘lakka ajratadi.

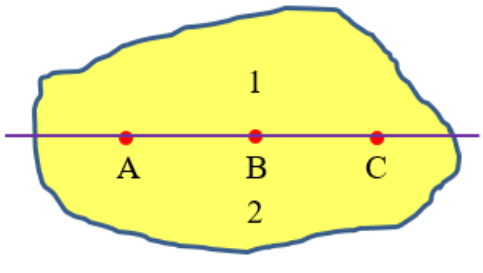


b) Tekislikni ikkita to‘g‘ri chiziq parallel bo‘lsa, uchta yarimtekislikdan iborat bo‘lakka ajratadi.

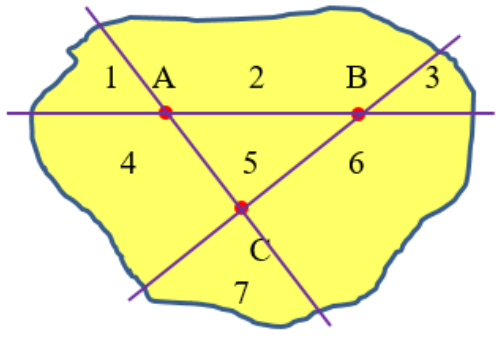


Tekislikni parallel bo‘lmagan ikkita to‘g‘ri chiziq to‘rtta yarimtekislikdan iborat bo‘lakka ajratadi.

10. AB, BC, AC to‘g‘ri chiziqlarni chizing. Ular tekislikni necha bo‘lakka ajratadi?



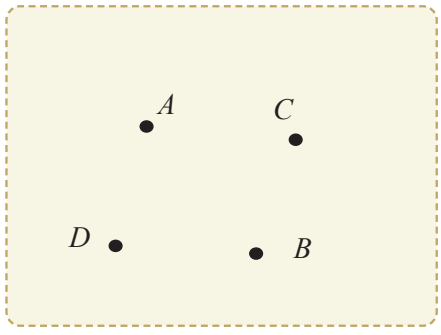
1-rasm

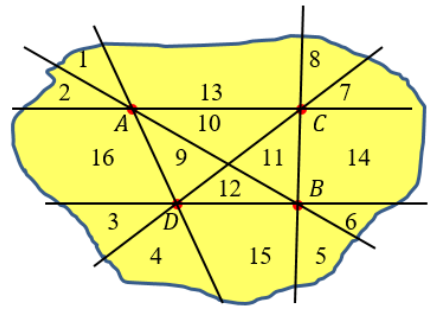


2-rasm

Agar A, B, C lar bir to‘g‘ri chiziqda bo‘lsa, tekislikni ikkita bo‘lakka ajratadi *(1-rasm)*.
Agar A, B, C lar bir to‘g‘ri chiziqda yotmasa, tekislikni yettita bo‘lakka ajratadi *(2-rasm)*.

11. Daftaringizga A, B, C va D nuqtalarni belgilang. Ularning har ikkisidan o‘tuvchi barcha to‘g‘ri chiziqlarni chizing. Jami nechta to‘g‘ri chiziq hosil bo‘ldi? Bu to‘g‘ri chiziqlar tekislikni necha bo‘lakka ajratadi?

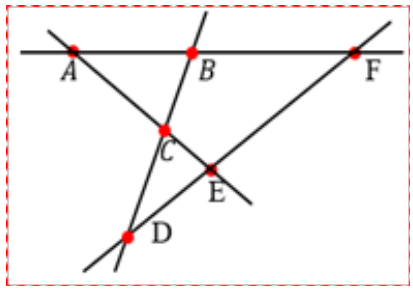


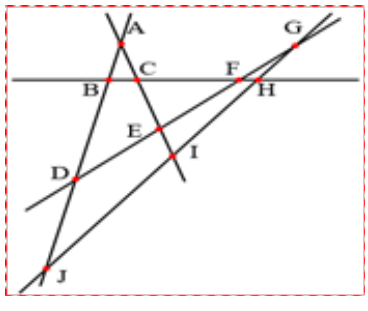


Jami: 6 ta to‘g‘ri chiziq hosil bo‘ldi. Bu to‘g‘ri chiziqlar tekislikni 15 ta bo‘lakka ajratadi.

Uyga vazifa

12*. To‘rtta to‘g‘ri chiziqda har ikkitasi kesishgan nuqtalar belgilandi. Nuqtalar soni ko‘pi bilan nechta bo‘ladi? To‘g‘ri chiziqlar beshta bo‘lsa-chi?



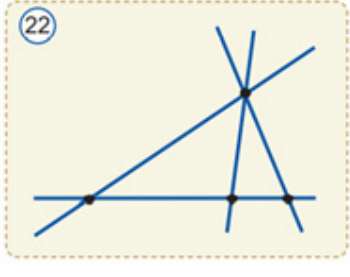


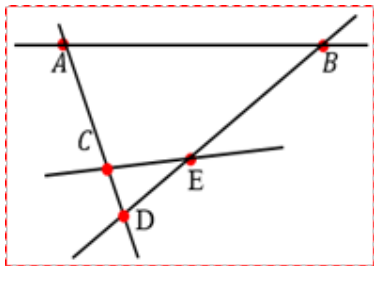
1) $n = 4$ bo‘lsa, nuqtalar soni 6 ta bo‘ladi.

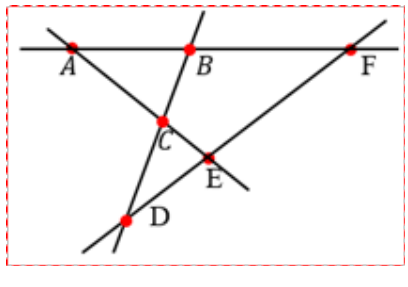
2) $n = 5$ bo‘lsa, nuqtalar soni 10 ta bo‘ladi.

To‘rtta to‘g‘ri chiziqning har ikkitasi kesishgan nuqtalar belgilanganda nuqtalar soni ko‘pi bilan oltita bo‘ladi. To‘g‘ri chiziqlar beshta bo‘lsa ham, nuqtalar soni oltita bo‘ladi.

13*. Rasmda to‘rtta to‘g‘ri chiziq to‘rtta nuqtada kesishyapti. Shunday chizma chizingki, ular: a) 5 ta; b) 6 ta nuqtada kesishsin. To‘rtta to‘g‘ri chiziq uchta nuqtadan o‘tishi mumkinmi?







To‘rtta to‘g‘ri chiziq uchta nuqtadan o‘tishi mumkin emas.

KESMA. KESMALARNI TAQQOSLASH VA O‘LCHASH (2 soat)

1-DARS

I. Standartlar:

M7.GO‘.GSH.03. Kesma va nurni ta’riflay oladi, ularning asosiy elementlarini va xossalarini biladi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– kesma va nur, geometrik shakllarning tengligini ta’riflay oladi;
– ularning asosiy elementlarini va xossalarini biladi.

Ko‘nikmalar:

– kesmalarni sirkul yordamida taqqoslay oladi, uzunligini chizg‘ich bilan o‘lchaydi va ular ustida amallar bajara oladi.

III. Dars mazmunining qisqacha tavsifi:

– kesmaning uzunligi va uning xossalari;
– kesmalarni o‘lchash.

IV. Dars ashyolari va ko‘rgazmali qurollar:

– chizg‘ich, turli o‘lchamdagi qog‘ozlar.

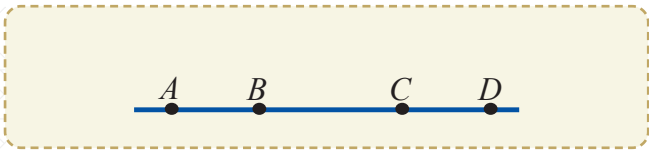
V. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Kesma va nurga ta’rif bering. Ular qanday belgilanadi?	“Aqliy hujum”	To‘g‘ri chiziqda C va D nuqtalar berilgan. CD va DC kesmalar ustma-ust tushadimi? CD va DC nurlar-chi?
Bilimlarni boyitish va mustahkamlash	Kesma, nur va to‘g‘ri chiziqning bir-biridan farqi, ularning tasvirlanishi va belgilanishi	Darslikdagi 3-, 4-rasmlar bilan ishlash	1. Kesma, nur va to‘g‘ri chiziq bir-biridan nimasi bilan farq qiladi? 2. Amaliy mashq va tatbiq (1, 2, 3).
	Kesmalarni taqqoslash	Darslikdagi 2-, 3-faollashtiruvchi mashqlarni bajarish	1. Qanday shakllarni o‘zaro teng deymiz? 28-rasmda qaysi shakllar o‘zaro teng? 2. Amaliy mashq va tatbiq (5,6).

Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikning 24-sahifasidagi 7-, 8-, 9-savollarga javob berish
Uyga vazifa	1. 32-rasmdagi teng shakllarni topish. 2. Darslikdagi 1-, 2-boshqotirmalarni yechish. 3. Mavzu bo‘yicha savollar (10-,11-savollar). 4. Amaliy mashq va tatbiq (4, 7, 9, 11, 12, 13, 14)		

Masalalar, yechimi va ularga doir ko‘rsatmalar

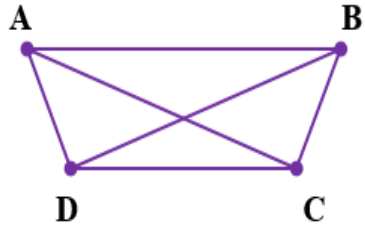
1. Rasmda nechta kesma bor?



a) 1) AB; 2) AC; 3) AD; 4) BC; 5) BD; 6) CD.

Javob: oltita kesma bor.

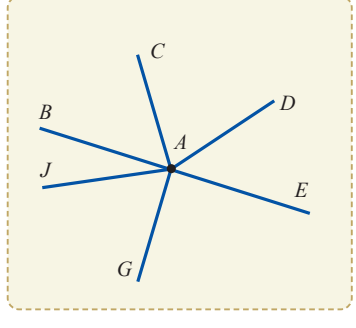
2. Uchlari to‘g‘ri chiziqdagi A, B, C, D nuqtalarda bo‘lgan jami nechta kesma bor? Ularni yozing.

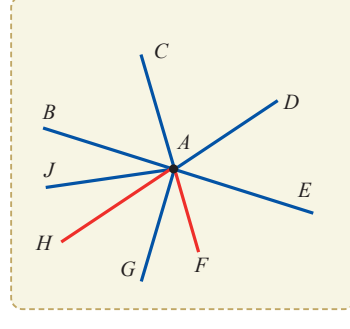


1) AB; 2) AC; 3) AD; 4) BC; 5) BD; 6) CD.

Javob: oltita kesma bor.

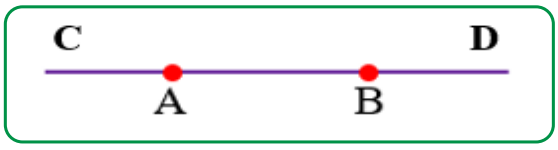
3. Rasmdagi barcha nurlarni yozing. Ularning qaysilari bir-birini to‘ldiruvchi?



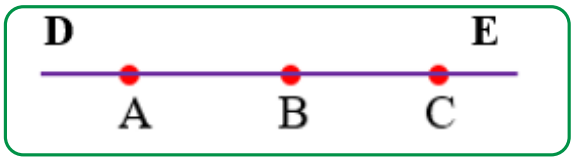


a) Nurlar: AB, AC, AD, AE, AG, AJ. Jami 6 ta nur bor.
b) AH, AF to‘ldiruvchi nurlar ko‘rsatilmagan.
To‘ldiruvchi nurlar: 1) AB va AE; 2) AC va AF; 3) AD va AH.

4. Bir to‘g‘ri chiziqda yotgan 2 ta nuqta shu to‘g‘ri chiziqda yotgan nechta nurni aniqlaydi? 3 ta nuqta-chi?

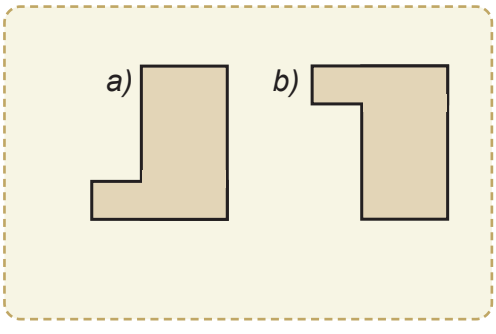


Nurlar: AC, AB, BA, BD.
Javob: 4 ta.



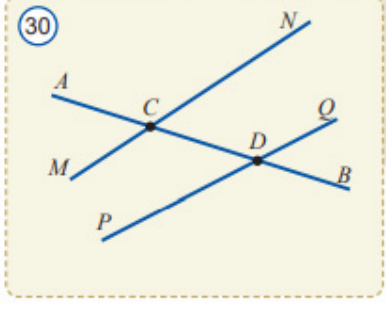
Nurlar: AD, AB, BA, BC, CB, CE.
Javob: 6 ta.

5. Rasmdagi 1-shaklni qog‘ozga o‘lchamlarini o‘zgartirmagan holda chizing va qirqib oling. Uni rasmdagi 2-shaklning (b) ustiga qo‘yish orqali ularni taqqoslang.



O‘quvchilar tomonidan mustaqil bajariladi.

Uyga vazifa



6. Rasmda AB to‘g‘ri chiziq MN va PQ to‘g‘ri chiziqlarni mos ravishda C va D nuqtalarda kesib o‘tadi. a) C nuqtadan chiquvchi; b) D nuqtadan chiquvchi va bir-birini to‘ldiruvchi nurlarni yozing.

a) C nuqtadan chiquvchi nurlar: CA, CD, CB, CM, CN.
Bu yerda bir-birini to‘ldiruvchi nurlar: CA va CD yoki CA va CB.

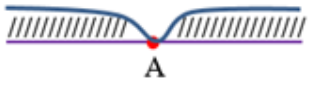
b) D nuqtadan chiquvchi nurlar: DC, DA, DB, DQ, DP.
Bu yerda bir-birini to‘ldiruvchi nurlar: DC va DB yoki DA va DB.

7. Quyidagi a) harf; b) raqam belgilarining qaysilari geometrik shakl sifatida o‘zaro teng? a) *a, b, g, d, i, y, n, o, p, u, q.* b) 1 2 3 4 5 6 7 8 9 0

a) Harf belgilarining ***b*** va ***d***, ***p*** va ***q***, ***n*** va ***u*** lar geometrik shakl sifatida o‘zaro teng. Chunki ularni qirqib olib ustma-ust qo‘yish mumkin.

b) raqam belgilarining 2 va 5, 6 va 9 lar geometrik shakl sifatida o‘zaro teng. Chunki ularni qirqib olib, aylantirish orqali ustma-ust tushirish mumkin.

8*. To‘g‘ri chiziqda yotgan: a) 1; b) 2; c) 3; d) 10; e) n ta nuqta uni nechta bo‘lakka bo‘ladi?



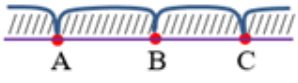
a) $n = 1;\quad n + 1 = 1 + 1 = 2.$

To‘g‘ri chiziqda yotgan 1 ta nuqta uni 2 ta bo‘lakka bo‘ladi.



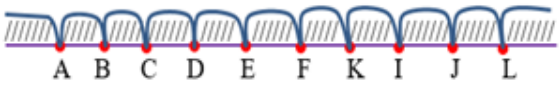
b) $n = 2;\ n + 1 = 2 + 1 = 3.$

To‘g‘ri chiziqda yotgan 2 ta nuqta uni 3 ta bo‘lakka bo‘ladi.



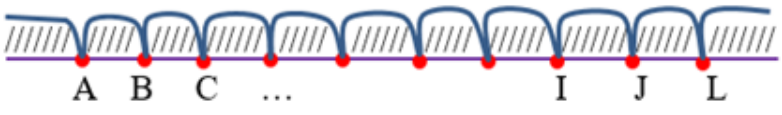
c) $n = 3;\ n + 1 = 3 + 1 = 4.$

To‘g‘ri chiziqda yotgan 3 ta nuqta uni 4 ta bo‘lakka bo‘ladi.



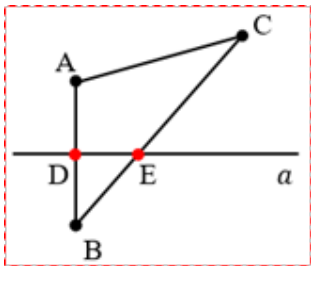
d) $n = 10;\ n + 1 = 10 + 1 = 11.$

To‘g‘ri chiziqda yotgan 10 ta nuqta uni 11 ta bo‘lakka bo‘ladi.



e) To‘g‘ri chiziqda yotgan n ta nuqta uni $n + 1$ ta bo‘lakka bo‘ladi.

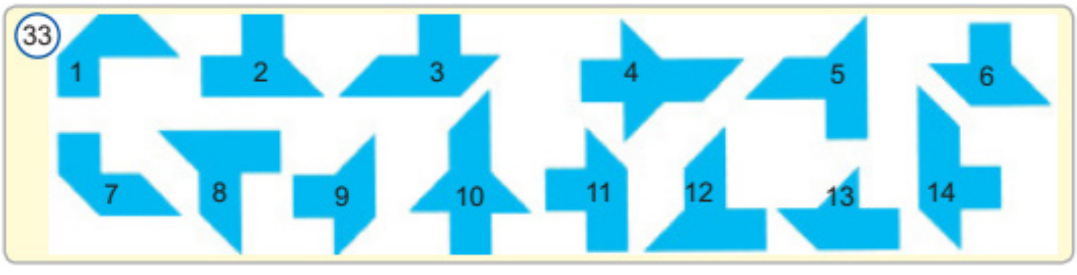
9*. To‘g‘ri chiziq va unda yotmaydigan A, B, C nuqtalar berilgan. AB kesma berilgan to‘g‘ri chiziqni kesib o‘tadi, AC kesma esa kesib o‘tmaydi. BC kesma bu to‘g‘ri chiziqni kesib o‘tadimi?



AB kesma berilgan a to‘g‘ri chiziqni D nuqtada kesib o‘tadi. AC kesma a to‘g‘ri chiziqni kesib o‘tmasa, BC kesma bu a to‘g‘ri chiziqni E nuqtada kesib o‘tadi.

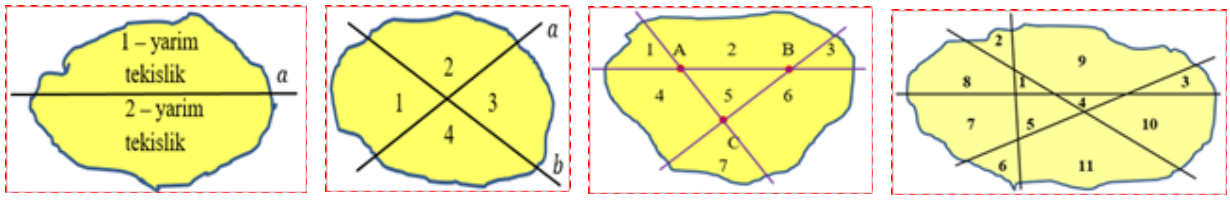
Javob: BC kesma a to‘g‘ri chiziqni kesib o‘tadi.

11. Rasmdagi teng shakllarni toping.



Teng shakllar: 1 va 7; 4 va 10; 5 , 8, 12; 6 va 9; 3 va 14.

12*. Tekislikda yotgan: a) bitta; b) ikkita; c) uchta; d) 4 ta to‘g‘ri chiziq uni ko‘pi bilan necha qismga ajratadi?



Qoida: n ta to‘g‘ri chiziq tekislikni $\frac{n(n+1)}{2}+1=\frac{n^2+n+2}{2}$ ta bo‘lakka bo‘lishi mumkin.

a) Bitta to‘g‘ri chiziq uni ko‘pi bilan 2 ta qismga ajratadi.

$$n=1;\quad \frac{n^2+n+2}{2}=\frac{1^2+1+2}{2}=\frac{1+1+2}{2}=\frac{4}{2}=2.$$

b) Ikkita to‘g‘ri chiziq uni ko‘pi bilan 4 ta qismga ajratadi.

$$n=2;\quad \frac{n^2+n+2}{2}=\frac{2^2+2+2}{2}=\frac{4+2+2}{2}=\frac{8}{2}=4.$$

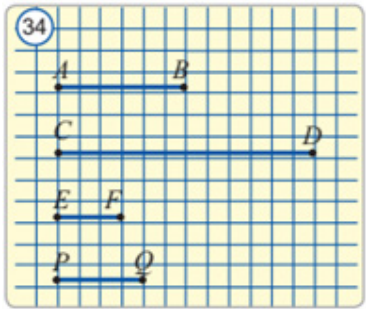
c) Uchta to‘g‘ri chiziq uni ko‘pi bilan 7 ta qismga ajratadi.

$$n=3;\quad \frac{n^2+n+2}{2}=\frac{3^2+3+2}{2}=\frac{9+3+2}{2}=\frac{14}{2}=7.$$

d) To‘rtta to‘g‘ri chiziq uni ko‘pi bilan 11 ta qismga ajratadi.

$$n=4;\quad \frac{n^2+n+2}{2}=\frac{4^2+4+2}{2}=\frac{16+4+2}{2}=\frac{22}{2}=11.$$

13. Rasmdagi AB kesmani birlik kesma deb olib, qolgan kesmalar uzunliklarini toping.



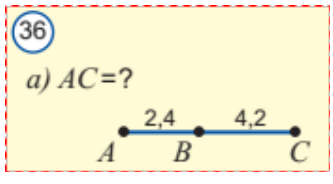
$$AB = 6\ katak = 1\ birlik;$$

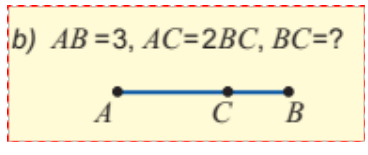
$$CD = \frac{12}{AB} = \frac{12}{6} = 2\ birlik;$$

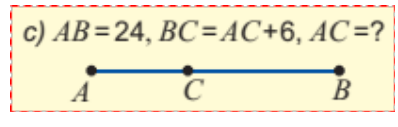
$$EF = \frac{3}{AB} = \frac{3}{6} = \frac{1}{2}\ birlik;$$

$$PQ = \frac{4}{AB} = \frac{4}{6} = \frac{2}{3}\ birlik.$$

14. Rasmdagi ma'lumotlardan foydalanib noma'lumlarni toping.







a) $AB = 2{,}4;\quad BC = 4{,}2.\quad AC = ?$

$AC = AB + BC = 2{,}4 + 4{,}2 = 6{,}6.$

Javob: $AC = 6{,}6.$

b) $AB = 3;\quad AC = 2BC.\quad BC = ?$

$AC + BC = AB;\quad 2BC + BC = 3;\quad 3BC = 3;\quad BC = \frac{3}{3};\quad BC = 1;$

$AC = 2BC = 2 \cdot 1 = 2.$ Javob: $BC = 1.$

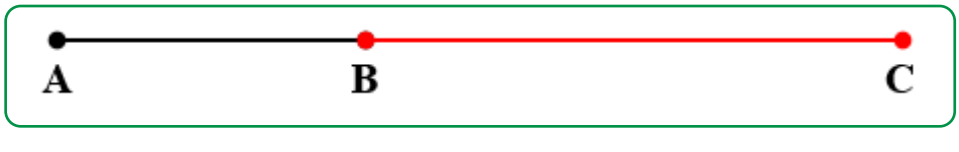
c) $AB = 24;\quad BC = AC + 6.\quad AC = ?$

$AC + BC = AB;\quad AC + AC + 6 = 24;\quad 2AC = 24\text{-}6;$

$2AC = 18;\quad AC = \frac{18}{2};\quad AC = 9.$

Javob: $AC = 9.$

15. Agar $B \in AC$, $AB = 7{,}2\ cm$, $AC = 2\ dm$ bo'lsa, BC ni toping.

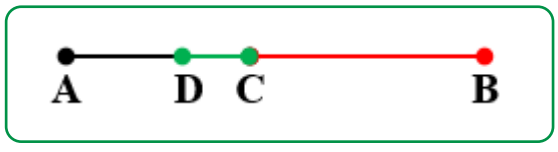


$B \in AC$, $AB = 7{,}2$ cm, $AC = 2$ dm $= 2 \cdot 1$ dm $= 2 \cdot 10$ cm $= 20$ cm.

$AB + BC = AC$; $BC = AC - AB = 20$ cm $- 7{,}2$ cm $= 12{,}8$ cm.

Javob: $BC = 12{,}8$ cm.

16. Agar $C \in AB$, $D \in AB$, $AB = 5$, $AC = 2{,}2$ va $BD = 3{,}6$ bo‘lsa, CD ni toping.



$AC + BC = AB$; $2{,}2 + BC = 5$; $BC = 5 - 2{,}2 = 2{,}8$; $BC = 2{,}8$;

$CD + BC = BD$; $CD = BD - BC = 3{,}6 - 2{,}8 = 0{,}8$.

Javob: $CD = 0{,}8$.

2-DARS

I. Standartlar:

M7.GO‘.GSH.04. Aylana va doirani ta’riflaydi, ularning elementlarini biladi va o‘zaro farqlaydi.

II. Dars maqsadi: o‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish.

Bilim:

– aylana va doiraning elementlari: markazi, vatari, diametri, radiusi va yoyini ta’riflay olish;
– uzunlik o‘lchov birliklarini farqlash.

Ko‘nikmalar:

– uzunlik o‘lchov birliklarini biladi va ikki nuqta orasidagi masofani aniqlay oladi;

III. Dars mazmunining qisqacha tavsifi:

– aylana va doira;
– aylana va doiraning elementlari.

IV. Dars ashyolari va ko‘rgazmali qurollar:

– sirkul, uzunlik o‘lchash asboblari, aylana va doira modellari.

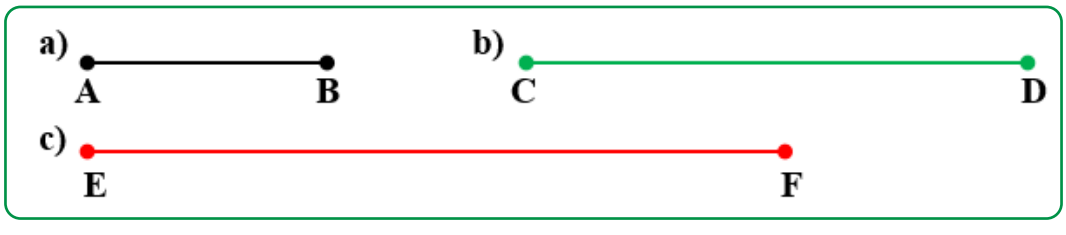
V. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Aylana va doiraning ta’rifi, ularning elementlari.	“Aqliy hujum”	Aylana va doira elementlarini sanab bering. Darslikda tasvirlangan aylananing markazi, barcha radiuslari, diametri va vatarlarini aniqlang va yozing.
Bilimlarni boyitish va mustahkamlash	Uzunlik o‘ lchov birliklari	Darslikdagi 23-, 24-rasmlar bilan ishlash	1. Nechanchi asrdan boshlab dunyo bo‘yicha xalqaro uzunlik o‘lchov birligi sifatida metr qabul qilingan? 2. Amaliy mashq va tatbiq (17, 18, 19, 20)

	Ikki nuqta orasidagi masofani aniqlash	Darslikdagi 3-, 4-faollashtiruv-chi mashqlarni bajarish	1. Markazi O nuqtada bo‘lgan aylana: a) OA to‘g‘ri chiziq; b) OA nur bilan nech-ta nuqtada kesishishi mum-kin? 2. Amaliy mashq va tatbiq (21, 22, 23)
Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikning 24-sahifasidagi 12-, 13-, 14-savollarga javob berish;
Uyga vazifa	1. Darslikdagi 3-, 4-boshqotirmalarni yechish. 2. Mavzu bo‘yicha savollar (13-, 14-savollar) 3. Amaliy mashq va tatbiq (24, 25, 26).		

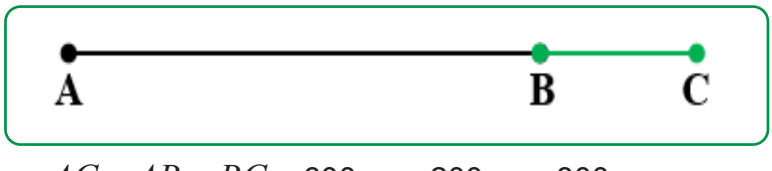
Masalalar, yechimlari va ularga doir ko‘rsatmalar

17. To‘g‘ri chiziqda ko‘z bilan chamalab: a) 3 cm; b) 7 cm; c) 10 cm bo‘lgan kesma ajrating. So‘nggi ishni qanchalik aniq bajarganingizni chizg‘ich bilan tekshiring.



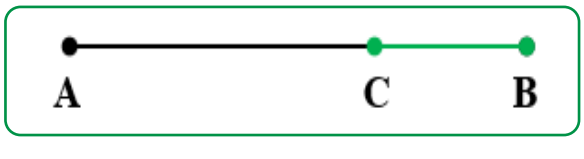
a) AB = 3,3 $cm \approx 3\ cm$; b) CD = 6,9 $cm \approx 7\ cm$; c) EF = 9,6 $cm \approx 10\ cm$.

18. To‘g‘ri chiziqdagi A,B,C nuqtalar uchun $AB = 600\ m$, $BC = 200\ m$ bo‘lsa, AC ni toping.



1-hol.
B nuqta AC kesmada bo‘lsa:

$AC = AB + BC$ = 600 m + 200 m = 800 m.
Javob: AC = 800 m.



2-hol.
C nuqta AB kesmada $AC = AB$-BC = 600 m -200 m = 400 m.

Javob: AC = 400 m.

19. Rasmda tasvirlangan aylananing markazi, barcha radiuslari, diametri va vatarlarini aniqlang va yozing.

Aylananing markazi: O nuqtadan iborat.

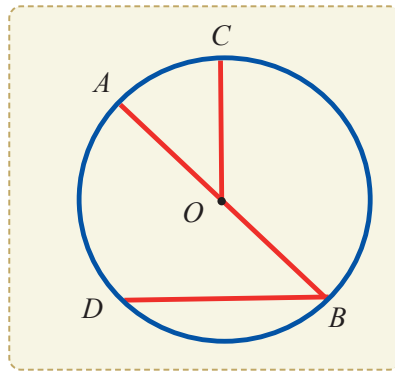
Aylananing barcha radiuslari: OA, OB, OC.

Aylana diametri: AB.

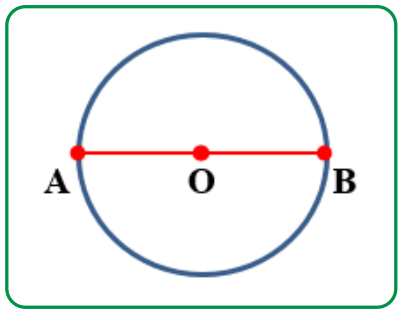
Aylana vatari: BD; uzun vatari: AB.

Aylana radiuslari: $R = OA = OB = OC = 2{,}5\ cm$.

Aylana diametri: $d = R+R = 2R = 2 \cdot 2{,}5 = 5\ cm$.



20. Aylananing radiusi 23 *cm* bo‘lsa, uning eng uzun vatarini toping.



Eng uzun vatar aylana markazi orqali o‘tuvchi AB kesmadir.

$R = OA = OB;\ \ R = 23\ cm;$

$AB = OA + OB = R+R = 2R = 2{\cdot}23\ cm = 46\ cm.$

Eng uzun vatar, ya’ni diametr $AB = 46\ cm$.

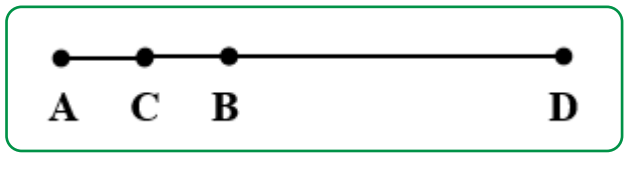
21. Aylananing a) radiusi 12 *cm* bo‘lsa, diametrini; b) diamerti 28 *dm* bo‘lsa, radiusini toping.

a) $R = 12\ cm.\ \ d = ?\qquad d = 2R = 2 \cdot 12\ cm = 24\ cm.$

b) $d = 28\ dm.\ \ R = ?\qquad R = \frac{d}{2} = \frac{28\ cm}{2} = 14\ dm.$

Javob: a) $d = 24\ cm$; b) $R = 14\ dm$.

22. To‘g‘ri chiziqdagi *A, B, C* va *D* nuqtalar uchun $AB = 2$, $AC = CB$, $2AD = 3BD$ bo‘lsa, CD ni toping.



$AC = CB = \frac{AB}{2} = \frac{2}{2} = 1;\qquad 2AD = 3BD;\qquad 2(AC + CB + BD) = 3BD;$

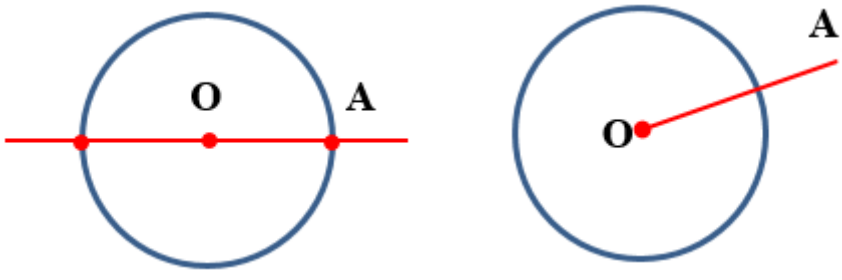
$2 \cdot (1 + 1 + BD) = 3BD;\qquad 2 \cdot (2 + BD) = 3BD;\qquad 4 + 2BD = 3BD;$

$3BD - 2BD = 4;\qquad BD = 4;\qquad AD = \frac{3BD}{2} = \frac{3 \cdot 4}{2} = \frac{12}{2} = 6;$

$CD = CB + BD = 1 + 4 = 5.$

Javob: $CD - 5$.

23. Markazi O nuqtada bo‘lgan aylana: a) OA to‘g‘ri chiziq; b) OA nur bilan nechta nuqtada kesishishi mumkin?



a) OA to‘g‘ri chiziq aylanani ikkita nuqtada kesib o‘tadi;
b) OA nur aylanani bitta nuqtada kesib o‘tadi.

Uyga vazifa

24*. Nur va uzunliklari $AB = 1,2\ cm$, $CD = 2,8\ cm$ bo‘lgan kesmalar berilgan. Bu kesmalardan foydalanib shu nurga uzunligi: a) 4 cm; b) 1,6 cm; c) 0,4 cm; d) 2,6 cm bo‘lgan kesmalarni qo‘ying.

a) $AD = AB + CD = 1,2\ cm + 2,8\ cm = 4\ cm.$



Javob: $AD = 4\ cm.$

b) $BD = CD - AB = 2,8\ cm - 1,2\ cm = 1,6\ cm.$



Javob: $BD = 1,6\ cm.$

c) $BD = CD - 2AB = 2,8\ cm - 2 \cdot 1,2\ cm = 2,8\ cm - 2,4\ cm = 0,4\ cm.$



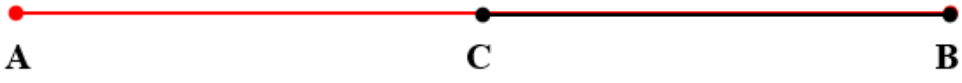
Javob: $BD = 0,4\ cm.$

d) $AD = AB + \frac{CD}{2} = 1{,}2\ cm + \frac{2{,}8\ cm}{2} = 1{,}2\ cm + 1{,}4\ cm = 2{,}6\ cm.$



Javob: $AD = 2{,}6\ cm.$

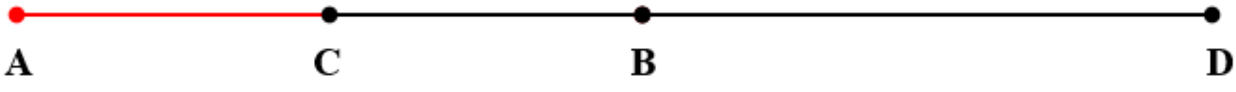
25. C nuqta AB kesmaning o‘rtasi va $CB = 13$ bo‘lsa, AB kesma uzunligini toping.



$AB = 2CB = 2 \cdot 13 = 26.$

Javob: $AB = 26.$

26. O‘zining yarmidan $46\ cm$ uzun bo‘lgan kesmaning uzunligini toping.



$CB = \frac{AB}{2}\ cm; \quad BD = 46\ cm. \quad CD = ?$

$CD = CB + BD = \frac{AB}{2} + 46\ cm.$

Javob: $CD = \frac{AB}{2} + 46\ cm.$

27. C nuqta AB kesmani $1:3$ nisbatda bo‘ladi. Agar AC kesma uzunligi a) 2,5 cm; b) 3,9 m; c) 1,4 km bo‘lsa, CB kesma uzunligini toping.



$AB = AC + CB;$ $CB = AB - AC;$ $AC : AB = 1:3;$ $AB = 3 \cdot AC.$

a) $AC = 2,5\ cm.$ $CB = ?$

$CB = AB - AC = 3AC - AC = 2AC = 2 \cdot 2,5\ cm = 5\ cm.$

Javob: $CB = 5\ cm.$

b) $AC = 3,9\ m.$ $CB = ?$

$CB = AB - AC = 3AC - AC = 2AC = 2 \cdot 3,9\ m = 7,8\ m.$

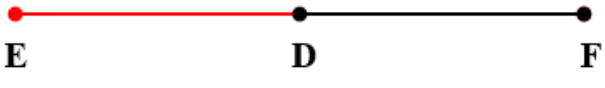
Javob: $CB = 7,8\ m.$

c) $AC = 1,4\ km.$ $CB = ?$

$CB = AB - AC = 3AC - AC = 2AC = 2 \cdot 1,4\ km = 2,8\ km.$

Javob: $CB = 2,8\ km.$

28. D nuqta EF kesmani 1:2 nisbatda bo‘ladi. Agar DE kesma uzunligi: a) 35 cm; b) 93 dm; c) 41 m bo‘lsa, EF kesma uzunligini toping.



$DE = \frac{EF}{2};$ $EF = 2DE;$

a) $DE = 35\ cm.$ $EF = 2DE = 2 \cdot 35\ cm = 70\ cm.$

Javob: $EF = 70\ cm.$

b) $DE = 93\ dm.$ $EF = 2DE = 2 \cdot 93\ dm = 186\ dm.$

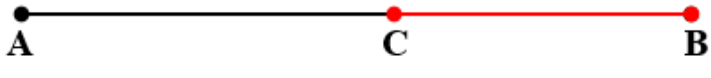
Javob: $EF = 186\ dm.$

c) $DE = 41\ m.$ $EF = 2DE = 2 \cdot 41\ m = 82\ m.$

Javob: $EF = 82\ m.$

29*. Uzunligi $9\ cm$ bo‘lgan AB kesma chizing. AB nurda shunday C nuqtani belgilangki: a) $AC - BC = 1\ cm;$ b) $AC + BC = 11\ cm;$ c) $AC + BC = 10\ cm$ bo‘lsin.

a)



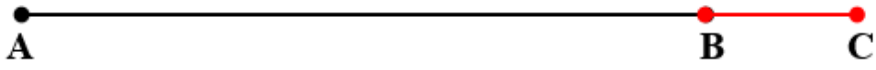
$AB = 9\ cm;$ $AC - BC = 1\ cm;$ $AC = 1\ cm + BC;$ $AC + BC = AB;$

$1\ cm + BC + BC = 9\ cm;$ $1\ cm + 2BC = 9\ cm;$ $2BC = 9\ cm - 1\ cm;$

$2BC = 8\ cm;$ $BC = \frac{8}{2}\ cm;$ $BC = 4\ cm;$ $AC = 1 + BC = 1\ cm + 4\ cm = 5\ cm.$

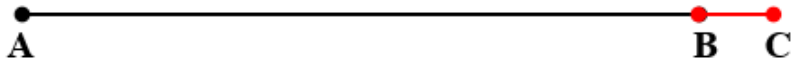
Javob: $AC = 5\ cm;\quad BC = 4\ cm.$

b)



$AB = 9\ cm;\quad AC + BC = 11\ cm;\quad AC = 11\ cm - BC;\quad AB + BC = AC;$
$9\ cm + BC = 11\ cm;\quad BC = 11\ cm - 9\ cm;\quad BC = 2\ cm;$
$AC = AB + BC = 9\ cm + 2\ cm = 11\ cm.$
Javob: $AC = 11\ cm;\quad BC = 2\ cm.$

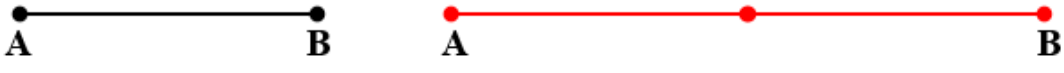
c)



$AB = 9\ cm;\quad AC + BC = 10\ cm;\quad AC = 10\ cm - BC;\quad AB + BC = AC;$
$9\ cm + BC = 10\ cm;\quad BC = 10\ cm - 9\ cm;\quad BC = 1\ cm;$
$AC = AB+BC = 9\ cm + 1\ cm = 10\ cm.$
Javob: $AC = 10\ cm;\quad BC = 1\ cm.$

30*. AB kesma berilgan. Uzunligi: a) $2AB$; b) $AB : 2$; c) $AB : 4$; d) $0,75AB$ bo‘lgan kesmalarni yasang.

a)



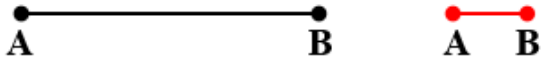
$2AB$ kesmani yasash uchun AB kesma chizib olinadi. Uning o‘lchami chizg‘ich yordamida o‘lchanadi. AB kesmaga teng bo‘lgan ikkita ketma-ket kesma qo‘yilib AB kesma yasaladi.

b)



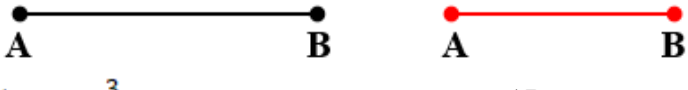
AB kesmani yasash uchun AB kesma chizib olinadi. Uning o‘lchami chizg‘ich yordamida o‘lchanadi. AB kesmaga teng bo‘lgan AB kesma yasaladi.

c)



$AB : 4 = \frac{1}{4}AB$ kesmani yasash uchun AB kesma chizib olinadi. Uning o‘lchami chizg‘ich yordamida o‘lchanadi. AB kesmaning to‘rtdan bir qismiga teng bo‘lgan AB kesma yasaladi.

d)



$0,75AB = \frac{3}{4}AB$ kesmani yasash uchun AB kesma chizib olinadi. Uning o‘lchami chizg‘ich yordamida o‘lchanadi. AB kesmaning to‘rtdan uch qismiga teng bo‘lgan AB kesma yasaladi.

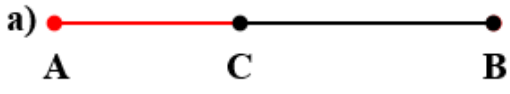
31*. To‘g‘ri chiziqdagi A, B, C nuqtalar uchun $AB = 5{,}6\ cm$, $AC = 8{,}9\ cm$ va $BC = 3{,}3\ cm$ ekani ma’lum. A, B, C nuqtalarning qaysi biri qolgan ikkitasining o‘rtasida yotadi?



$AB + BC = AC;\quad 5{,}6\ cm + 3{,}3\ cm = 8{,}9\ cm.$

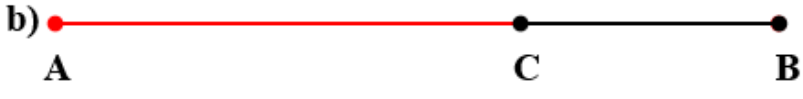
Javob: B nuqta A va C nuqtalar orasida yotadi.

32. C nuqta A va B nuqtalar orasida yotadi. Agar: a) $AC = 2{,}5\ cm;\ CB = 3{,}4\ cm;$ b) $AC = 5{,}3\ dm,\ CB = 4{,}2\ dm$ bo‘lsa, AB kesma uzunligini toping.



$AB = AC + CB = 2{,}5\ cm + 3{,}4\ cm = 5{,}9\ cm.$

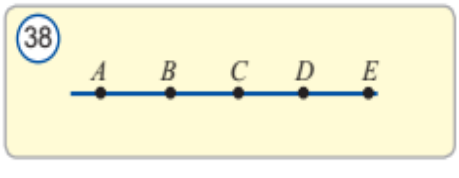
Javob: $AB = 5{,}9\ cm.$



$AB = AC + CB = 5{,}3\ dm + 4{,}2\ dm = 9{,}5\ dm.$

Javob: $AB = 9{,}5\ dm.$

33*. Rasmda AB, BC, CD va DE kesmalar o‘zaro teng. Agar birlik kesma sifatida a) AB; b) AC; c) AE kesma olingan bo‘lsa, AD kesmaning uzunligini toping.



a) $AB = BC = CD = DE;\ AD = ?$

$AD = AB + BC + CD = AB + AB + AB = 3AB.$

Javob: $AD = 3AB.$

b) $AB = BC = CD = DE;\quad AC = AB + BC;\quad CD = \dfrac{AC}{2}.\quad AD = ?$

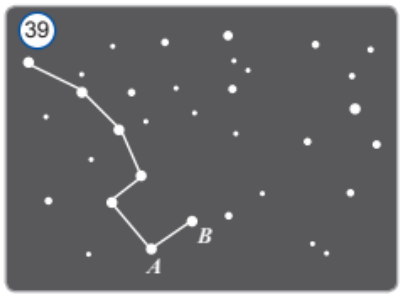
$AD = (AB + BC) + CD = AC + \dfrac{AC}{2} = \dfrac{2AC + AC}{2} = \dfrac{3AC}{2}.$ Javob: $AD = \dfrac{3AC}{2}.$

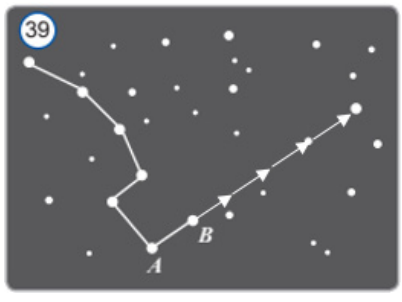
c) $AB = BC = CD = DE;\quad AE = AB + BC + CD + DE;\quad DE = \dfrac{AE}{4};\quad AD = ?$

$AD = AE - DE = AE - \dfrac{AE}{4} = \dfrac{4AE - AE}{4} = \dfrac{3AE}{4}.$

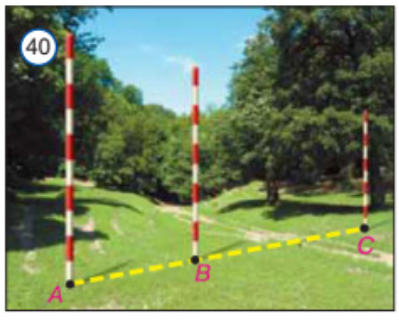
Javob: $AD = \dfrac{3AE}{4}.$

34. Rasmlarda (a-rasm) Katta ayiq yulduz turkumi tasvirlangan. Agar bu yulduzlarni kesmalar bilan tutashtirsak, “cho‘mich”ga o‘xshash shakl hosil bo‘ladi. “Cho‘mich”ning oxirgi ikki yulduzi hosil qilgan AB kesma B nuqtadan boshlab AB nur bo‘yicha 4 marta qo‘yib chiqilsa (b-rasm), Qutb yulduzining yaqiniga boriladi. Rasmdan Qutb yulduzi qayerda joylashganini aniqlang.



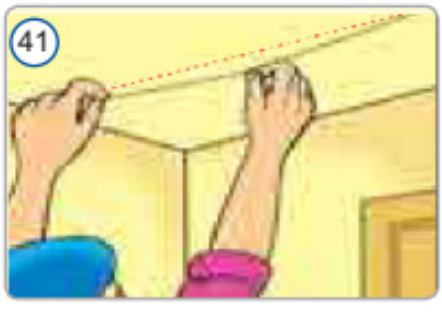


35. Rasmda dala sharoitida to‘g‘ri chiziq “tortish” jarayoni tasvirlangan. Undan bog‘da yoki tomorqada ko‘chatlarni bir tekis ekishda foydalaniladi. Bu amaliy ish to‘g‘ri chiziqning qaysi geometrik xossasiga asoslangan ekanini izohlang.



Izoh. Bu amaliy ish to‘g‘ri chiziqning *“bir to‘g‘ri chiziqda olingan istalgan uchta nuqtaning faqat bittasi qolgan ikkitasining orasida yotadi”* geometrik xossasiga asoslangan.

36. Rasmda bo‘yoqchining shiftga to‘g‘ri chiziq chizish jarayoni tasvirlangan. Buning uchun ip bo‘r bilan oq rangga bo‘yaladi. Ipning bir uchi mixga bog‘lanadi, ikkinchi uchi esa tegishli nuqtaga qo‘yiladi. So‘ng uning o‘rtasidan ushlab tarang tortiladi va qo‘yib yuboriladi. Shunda ipga ilashgan bo‘r zarralari shiftga yopishib, to‘g‘ri chiziqni hosil qiladi. Xuddi shunday usulda devorga ham to‘g‘ri chiziq chizish mumkin. Bu amaliy ish to‘g‘ri chiziqning qaysi geometrik xossasiga asoslangan ekanligini izohlang.



Izoh. Bu amaliy ish to‘g‘ri chiziqning *“har qanday ikki nuqtadan faqat bitta to‘g‘ri chiziq o‘tadi”* geometrik xossasiga asoslangan.

BURCHAK. BURCHAKLARNI TAQQOSLASH VA O‘LCHASH (2 soat)

1-DARS

I. Standartlar:

M7.GO‘.GSH.05. Burchak va uning elementlarini biladi, burchakning tashqi va ichki sohalarini farqlay oladi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– burchak, yoyiq burchak, yarim tekislikni ta’riflay olish;
– burchakni nurga qo‘ya olish.

Ko‘nikmalar:

– burchak o‘lchov birliklarini biladi va transportir yordamida burchakni o‘lchaydi va taqqoslay oladi.

III. Dars mazmunining qisqacha tavsifi:

– burchak va uning elementlari, burchakning tashqi va ichki sohalari.

IV. Dars ashyolari va ko‘rgazmali qurollar:

– transportir, yelpig‘ich.

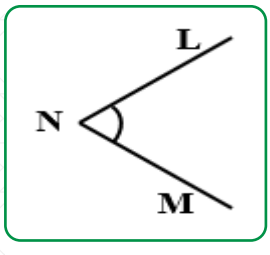
V. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Burchak va uning elementlarini ayting.	Tarmoqlash	Burchak nima va u qanday belgilanadi?
Bilimlarni boyitish va mustahkamlash	Yoyiq burchak, yarim tekislik nima?	Darslikdagi 2-, 3-rasm bilan ishlash	Yoyiq burchak nima?
	Burchakni nurga qo‘yish	Darslikning 32-sahifasidagi nurga berilgan gradus o‘lchovli burchakni qo‘yishning amaliy yo‘rig‘i bilan ishlash;	1. Darslikning 22-rasmidagi POQ va ABC burchaklarni MN nurga qo‘yish orqali taqqoslang. 2. Amaliy mashq va tatbiq (1, 2, 3, 4, 5.)

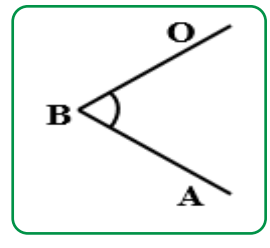
Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikning 33-sahifasidagi 1-, 2-, 3-, 4-savollarga javob berish
Uyga vazifa	1. Darslikning 36-sahifasidagi 1-, 4-amaliy mashqlarni yechish. 2. Hozir yer o‘lchash ishlarida foydalaniladigan yuqori aniqlikka ega elektron teodolit haqida ma’lumot keltirish.		

Masalalar, yechimlari va ularga doir ko‘rsatmalar

1. a) $\angle MNL$; b) $\angle ABO$ burchakni chizing. Uning uchi va tomonlarini yozing.

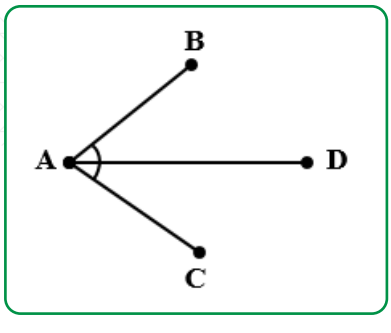


Burchakning uchi: N.
Burchakning tomonlari: NM va NL.



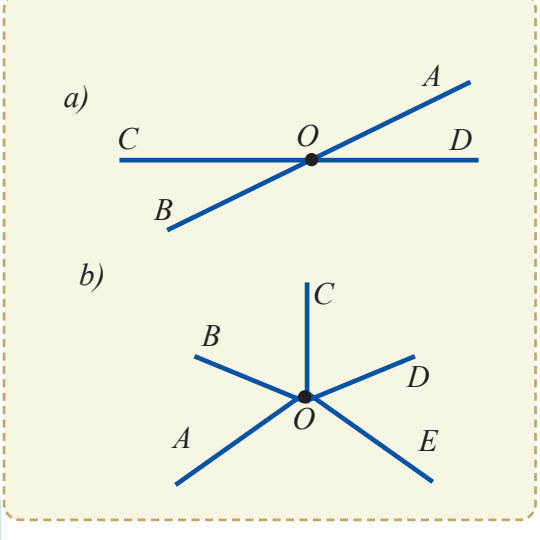
Burchakning uchi: B.
Burchakning tomonlari: BA va BO.

2. Ixtiyoriy A, B, C va D nuqtalarni belgilab, AB, AC va AD to‘gri chiziqlarni chizing. Hosil bo‘lgan burchaklarni, ularning uchlari va tomonlarini yozing.



Hosil bo‘lgan burchaklar: $\angle BAC$, $\angle BAD$, $\angle CAD$;
Burchakning uchi: A.
Burchakning tomonlari: AB, AC, AD.

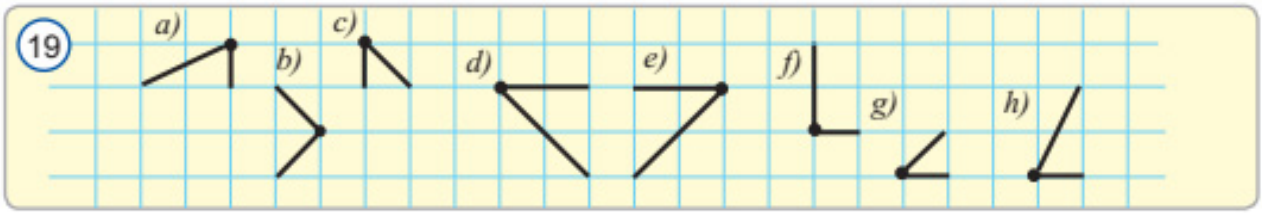
3. Rasmda tasvirlangan barcha burchaklarni aniqlang va ularni yozing.



a) Burchaklar: $\angle AOC$, $\angle COD$, $\angle BOD$, $\angle AOD$, $\angle AOB$, $\angle COD$.

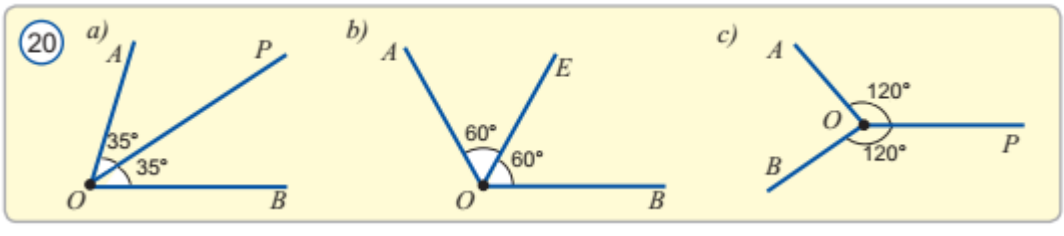
b) Burchaklar: $\angle AOB$, $\angle BOC$, $\angle COD$, $\angle DOE$, $\angle AOE$, $\angle AOC$, AOD, $\angle BOD$, $\angle COE$, $\angle BOE$.

4. Rasmda tasvirlangan burchaklar orasidan teng burchaklarni aniqlang.



Javob: 1) a va h burchaklar teng, ya'ni 60° li burchaklar;
2) c, d, e, g burchaklar teng, ya'ni 45° li burchaklar;
3) b va f burchaklar teng, ya'ni 90° li burchaklar.

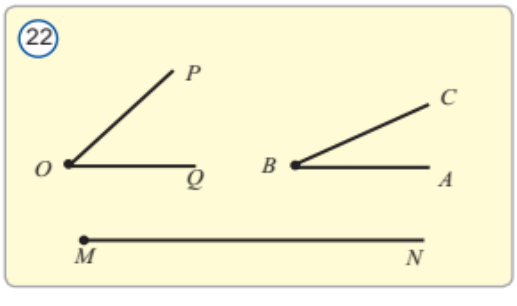
5. 20-rasmda tasvirlangan OP nur AOB burchak bissektrisasi bo'ladimi?

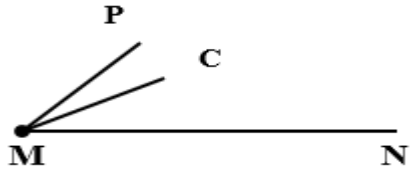


a) $\angle AOP = \angle BOP = 35°$ bo'lgani uchun OP nur AOB burchak bissektrisasi bo'ladi.
b) $\angle AOE = \angle BOE = 60°$ bo'lgani uchun OE nur AOB burchak bissektrisasi bo'ladi.
c) $\angle AOP = \angle BOP = 120°$ OP nur AOB burchakning ichki sohasini teng ikkiga bo'lsa, bissektrisa bo'ladi, OP nur tashqi sohasini bo'lganligi uchun bissektrisa bo'la olmaydi.

Uyga vazifa

6. Rasmdagi POQ va ABC burchaklarni MN nurga qo'yish orqali taqqoslang.

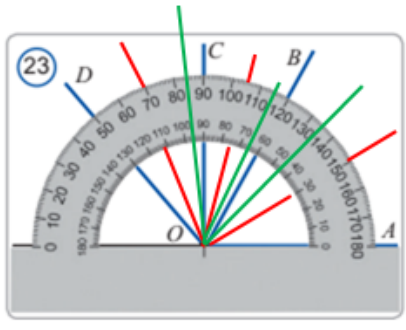


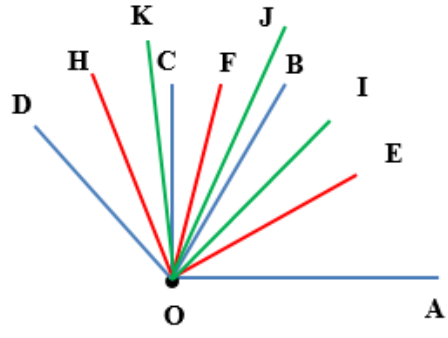


O va B uchlar M uch bilan ustma-ust tushadi, xuddi shunday OQ va BA nurlar MN nur bilan ustma-ust qo'yib, OP va BC nurlar parallel ko'chirish orqali M uchga o'tkazilib burchaklar taqqoslanadi. Ko'rinib turibdiki, $\angle PMN > \angle CMN$, bundan $\angle POQ > \angle ABC$

ekanligi kelib chiqadi. Demak, $\angle POQ > \angle ABC$.

7. Rasmdan foydalanib AOB, AOC, AOD, BOC, BOD va COD burchaklarning gradus o‘lchovlarini aniqlang hamda transportir yordamida bissektrisalarini yasang.





1) $\angle AOB = 60°$; 2) $\angle AOC = 90°$; 3) $\angle AOD = 130°$;

4) $\angle BOC = 30°$; 5) $\angle BOD = 70°$; 6) $\angle COD = 40°$.

1. OE bissektrisa AOB burchakni teng ikkiga bo‘ladi:

$$\angle AOE = \angle BOE = \frac{\angle AOB}{2} = \frac{60°}{2} = 30°.$$

2. OI bissektrisa AOC burchakni teng ikkiga bo‘ladi:

$$\angle AOI = \angle COI = \frac{\angle AOB}{2} = \frac{90°}{2} = 45°.$$

3. OJ bissektrisa AOD burchakni teng ikkiga bo‘ladi:

$$\angle AOJ = \angle DOJ = \frac{\angle AOD}{2} = \frac{130°}{2} = 65°.$$

4. OF bissektrisa BOC burchakni teng ikkiga bo‘ladi:

$$\angle BOF = \angle COF = \frac{\angle BOC}{2} = \frac{30°}{2} = 15°.$$

5. OK bissektrisa BOD burchakni teng ikkiga bo‘ladi:

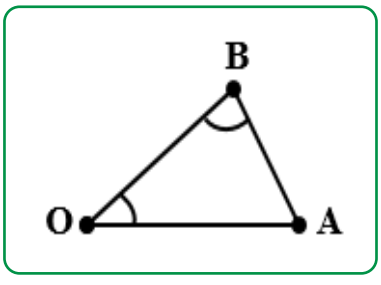
$$\angle BOK = \angle DOK = \frac{\angle BOD}{2} = \frac{70°}{2} = 35°.$$

6. OH bissektrisa COD burchakni teng ikkiga bo‘ladi:

$$\angle COH = \angle DOH = \frac{\angle COD}{2} = \frac{40°}{2} = 20°.$$

8. Quyidagi tengliklar ma’noga egami?

a) $\angle AOB = \angle BOA;$ b) $\angle AOB = \angle ABO.$



a) $\angle AOB = \angle BOA$ tenglik ma’noga ega, chunki $\angle O = \angle O$.
b) $\angle AOB = \angle ABO$ tenglik ma’noga ega emas, chunki tenglikdagi $\angle AOB$ da burchakning uchi O, $\angle ABO$ da burchakning uchi B, $\angle O$ va $\angle B$ ustma-ust tushmaydi. Demak, $\angle O \neq \angle B$.

2-DARS

I. Standartlar:

M7.GO‘.O‘U.02. Burchak o‘lchov birliklarini biladi, transportir yordamida burchakni o‘lchaydi va taqqoslay oladi:

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– burchak o‘lchov birliklari va transportir yordamida burchakni o‘lchash;
– burchakni taqqoslay olish.

Ko‘nikmalar:

– transportir yordamida burchakni yasay oladi.

III. Dars mazmunining qisqacha tavsifi:

– burchak o‘lchov birliklari va transportir yordamida burchakni o‘lchash va taqqoslash.

IV. Dars ashyolari va ko‘rgazmali qurollar:

– transportir, yelpig‘ich.

V. Darsning qisqacha texnologik xaritasi:

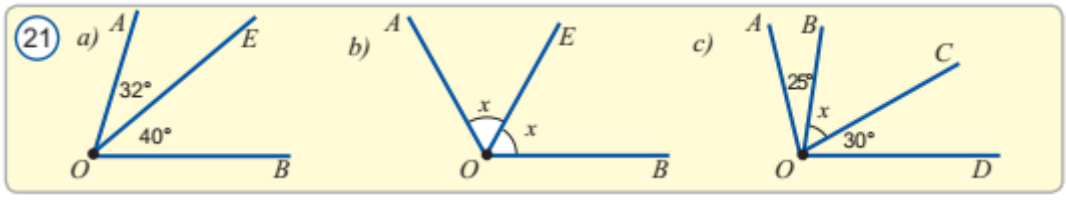
Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Burchakning gradus o‘lchovi nima?	“Aqliy hujum”	Yoyiq burchak necha gradus? 1° ga teng burchak deganda qanday burchakni tushunasiz?

Bilimlarni boyitish va mustahkamlash	Usturlab (astrol-yabiya) – burchak o‘lchaydigan as-bob haqida	Darslikdagi 26-, 27-rasmlar bilan ishlash	Qadimiy va zamonaviy burchak o‘lchash asboblariga misollar keltiring.
	Burchaklarni taqqoslash	Darslikning 30-sahifasidagi 6-, 7-, 8-rasmlar bilan ishlash	1. Ikki burchakning gradus o‘lchovlari teng bo‘lsa, ular teng bo‘ladimi? 2. Amaliy mashq va tatbiq (6, 10, 11, 12).
Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	17-rasmda burchak gradus o‘lchovining qaysi xossasi keltirilgan?
Uyga vazifa	1. Darslikdagi 13-, 14-, 15-, 16-amaliy mashqlarni yechish. 2. O‘lchash asboblari haqida tarixiy ma’lumotlar keltirish.		

Masalalar, yechimlari va ularga doir ko‘rsatmalar

1. Rasmdan foydalanib quyidagilarni aniqlang:

a) $\angle AOB = ?;$ b) $\angle AOB = 120°38',\ x = ?;$ c) $\angle AOD = 105°45',\ x = ?$



a) $\angle AOE = 32°;\quad \angle BOE = 40°;\quad \angle AOB = ?$

$\angle AOB = \angle AOE + \angle BOE = 32° + 40° = 72°.$

Javob: $\angle AOB = 72°.$

b) $\angle AOB = 120°38';\quad \angle AOE = \angle BOE = x;\quad x = ?$

$\angle AOE + \angle BOE = \angle AOB;\quad x + x = \angle AOB;\quad 2x = 120°38';\quad x = 60°19'.$

Javob: $x = \angle AOE = BOE = 60°19'.$

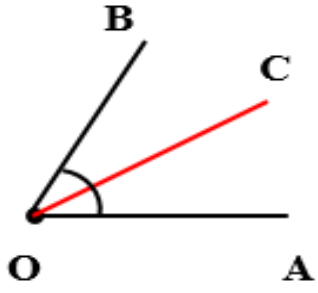
c) $\angle AOD = 105°45';\quad \angle AOE = 25°;\quad \angle COD = 30°;\quad \angle BOC = x = ?$

$\angle AOB + \angle BOC + \angle COD = \angle AOD;\quad 25° + x + 30° = 105°45';$

$55° + x = 105°45';\quad x = 105°45' - 55° = 50°45'.$

Javob: $x = \angle AOC = 55°45'.$

2. Transportir bilan 60° va 176° li burchaklar, ularning bissektrisalarini yasang.

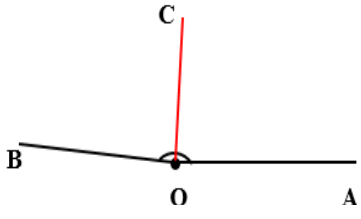


$\angle AOB = 60°$; OC – bissektrisa bo‘lganligi uchun

$$\angle AOC = \angle BOC; \quad \angle AOC = \angle \frac{AOB}{2} = \frac{60°}{2} = 30°.$$

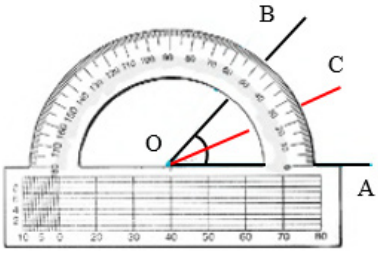
Javob: $\angle AOC = 30°$; $\angle BOC = 30°$.

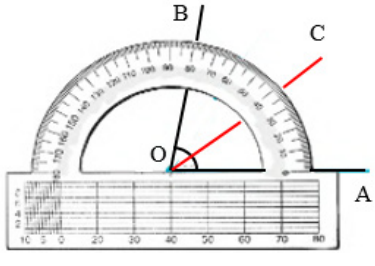
$\angle AOB = 176°$; OC – bissektrisa bo‘lganligi uchun

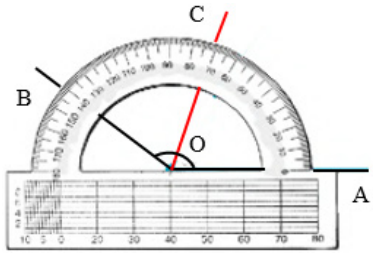


$$\angle AOC = \angle BOC; \quad \angle AOC = \angle \frac{AOB}{2} = \frac{176°}{2} = 88°.$$

3. Transportir yordamida *49°*, *79°* va *142°* li burchaklar hamda ularning bissektrisalarini yasang.





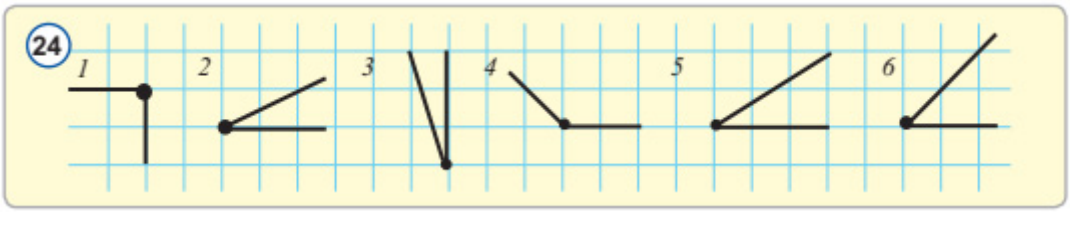


1) $\angle AOB = 49°$; $OC - bissektrisa, \angle AOC = \angle BOC = \frac{\angle AOB}{2} = \frac{49°}{2} = 24{,}5°$.

2) $\angle AOB = 79°$; $OC - bissektrisa, \angle AOC = \angle BOC = \frac{\angle AOB}{2} = \frac{79°}{2} = 39{,}5°$.

3) $\angle AOB = 142°$; $OC - bissektrisa, \angle AOC = \angle BOC = \frac{\angle AOB}{2} = \frac{142°}{2} = 71°$.

4*. Rasmda tasvirlangan burchaklar raqamlarini ularning gradus o‘lchovlari o‘sish tartibida yozing.



1) $90°$; 2) $22,5°$; 3) $15°$ 4) $135°$; 5) $30°$ 6) $45°$.

Javob: 3) $15°$; 2) $22,5°$; 5) $30°$; 6) $45°$; 1) $90°$; 4) $135°$.

Uyga vazifa

5. Hisoblang:

a) $34°18' + 53°38'$; b) $15°8'\,38'' + 113°21'\,9''$; c) $115°8'38'' - 113°21'9''$.

Izoh: $1° = 60'$; $1' = 60''$;

a) $34°18' + 53°38' = (34° + 53°) + (18' + 38') = 87° + 56' = 87°56'$;

b) $15°8'\,38'' + 113°21'\,9'' = (15° + 113°) + (8' + 21') + (38'' + 9'') =$

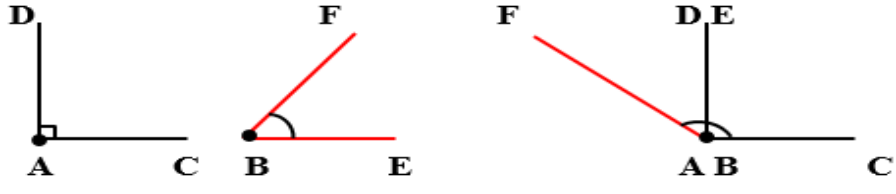
$= 128° + 29' + 47'' = 128°29'\,47''$;

c) $115°8'\,38'' - 113°21'\,9'' = 114° + 1° + 8' + 38'' - (113° + 21' + 9'') =$

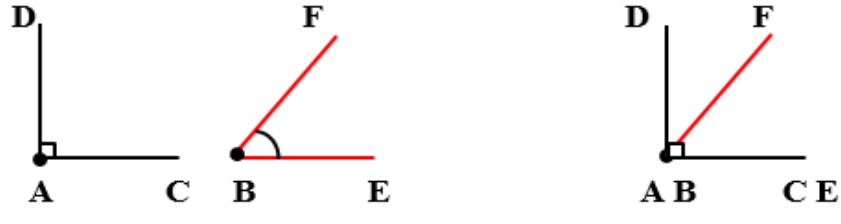
$= 114° + 60' + 8' + 38'' - (113° + 21' + 9'') = 114° + 68' + 38'' - (113° + 21' +$

$+ 9'') = (114° - 113°) + (68' - 21') + (38'' - 9'') = 1° + 47' + 29'' = 1°47'\,29''$.

6. $\angle A$ va $\angle B$ berilgan $\angle A > \angle B$ bo‘lsa, $\angle A + \angle B$ va $\angle A - \angle B$ burchaklarni yasang.

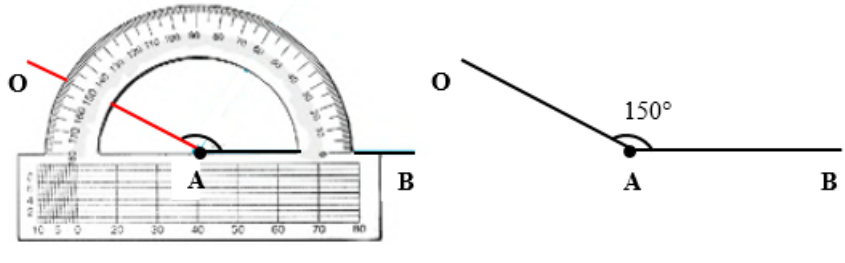


$\angle A + \angle B = \angle CAD + \angle EBF = \angle CAF$ yoki $\angle A + \angle B = \angle CAD + \angle EBF = \angle CBF$.



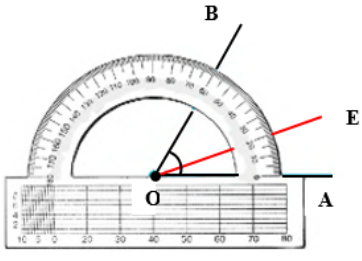
$\angle A - \angle B = \angle CAD - \angle EBF = \angle DAF$ yoki $\angle A - \angle B = \angle CAD - \angle EBF = \angle DBF$.

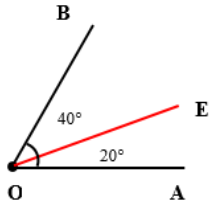
7. Berilgan AB nurga 150^o li OAB burchakni qo‘ying.



8*. Agar: a) $\angle AOE = 20°$, $\angle EOB = 40°$, $AOB = 60°$; b) $\angle AOE = 80°$, $\angle EOB = 120°$; c) $\angle AOE > \angle AOB$ bo‘lsa, OE nur $\angle AOB$ tomonlari orasidan o‘tadimi?

a) $\angle AOE = 20°$, $\angle EOB = 40°$, $AOB = 60°$.

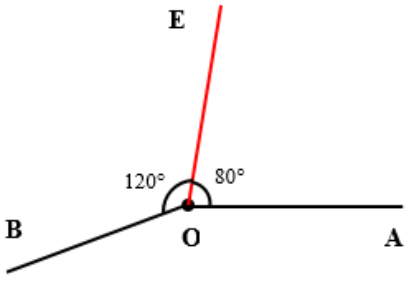




$\angle AOE + \angle EOB = \angle AOB$;
$20° + 40° = 60°$.

Javob: ha, OE nur $\angle AOB$ tomonlari orasidan o‘tadi.

b) $\angle AOE = 80°$, $\angle EOB = 120°$;



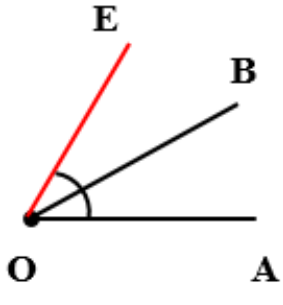
$\angle AOE + \angle EOB = \angle AOB$; $80° + 120° = 200°$.

Javob: yo‘q, OE nur $\angle AOB$ tomonlari orasidan o‘tmaydi.

Chunki nur burchak orasidan o‘tishi uchun: $0° < \angle AOB < 180°$ oraliqda bo‘lishi zarur.

Bunda $0° < 200° < 180°$; noto‘g‘ri tengsizlikdir.

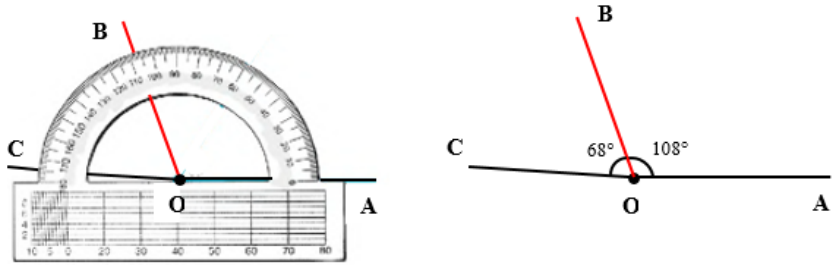
c) $\angle AOE > \angle AOB$.



$\angle AOB + \angle BOE = \angle AOE$.

Javob: yo‘q, OE nur $\angle AOB$ tomonlari orasidan o‘tmaydi.

9*. OC nur AOB burchak tomonlari orasidan o‘tadi. Agar $\angle AOB = 108°$, $\angle BOC = 68°$ bo‘lsa, $\angle AOC$ ni topnig va bu burchaklarni transportir yordamida yasang.



$\angle AOC = \angle AOB + \angle BOC = 108° + 68° = 176°.$

Javob: $\angle AOC = 176°.$

10*. Strelkali soatda: a) 3 ^{00}; b) 6 ^{00} bo‘lganda soat va minut millari hosil qilgan burchak necha gradusga teng bo‘lishini aniqlang.



a) Soat 3^{00} da, $\angle O = \frac{360°}{12} \cdot 3 = 30° \cdot 3 = 90°.$

Javob: $\angle O = 90°$ ga teng.



b) Soat 6^{00} da, $\angle O = \frac{360°}{12} \cdot 6 = 30° \cdot 6 = 180°.$

Javob: $\angle O = 180°$ ga teng.

AMALIY MASHQ VA TATBIQ (1 soat)

I. Standartlar:

M7.GO‘.MM.23. Geometrik mushohada yuritish orqali amaliy masalalarni yecha oladi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– geometrik shakllarning xossalarini bilish.

Ko‘nikmalar:

– geometrik mushohada yuritish orqali amaliy masalalarni yecha oladi;

III. Dars mazmunining qisqacha tavsifi:

– geometrik shakllarning xossalari haqida geometrik va mantiqiy fikrni rivojlantirish.

IV. Dars ashyolari va ko‘rgazmali qurollar:

– transportir, chizg‘ich, g‘isht, kitob

V. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Geometriyaga oid bilimlarni hayotda qayerlarda qo‘llash mumkin?	“Aqliy hujum”	Kesmalar qanday taqqoslanadi?
Bilimlarni boyitish va mustahkamlash	Burchakka oid bilimlaringizni qayerda qo‘llash mumkin?	Hayotiy vaziyatlarga oid misollar keltirish	Tevarak-atrofdan turli burchaklarga oid misollar keltiring.
	O‘lchashga oid mashqlarni bajarish	Amaliy mashg‘ulot bajarish	Amaliy mashq va tatbiq (1, 2, 3, 4)
Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikning 38-sahifasidagi 6-, 8-amaliy mashqlarni bajarish
Uyga vazifa	Darslikdagi 9-, 11-amaliy mashqlarni yechish.		

Masalalar, yechimlari va ularga doir ko‘rsatmalar

1. Qo‘lingizdagi darslikning bo‘yi, eni va qalinligini chizg‘ich yordamida o‘lchang.

Darslik bo‘yi: $21{,}8\ cm;$ darslik eni: $17\ cm$,
darslik qalinligi: $1{,}1\ cm$.

Izoh. Ushbu yechim namuna sifatida keltirildi. Dars jarayonida amaliy mashq o‘quvchilar qo‘lidagi darslikda bajariladi.

2. Qo‘lingizdagi darslikning bir varag‘i qalinligini qanday o‘lchash mumkin?

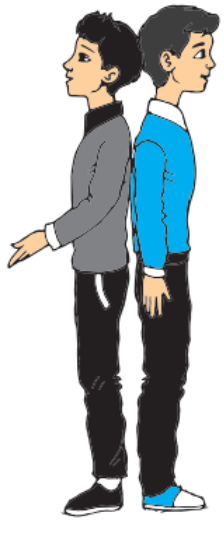
Darslikning bir varag‘i qalinligini chizg‘ich yordamida o‘lchash mumkin emas. Uni o‘lchash ishini quyidagicha bajaramiz;

Darslik jami 80 varaqdan iborat, uning qalinligi 0,9 mm ni tashkil etadi. Demak: $n = 80;\quad h = 0{,}9\,mm;\quad h_1 = ?$

$$h_1 = \frac{h}{n} = \frac{0{,}9\,mm}{80} = \frac{9}{800}\,mm = 0{,}01125\,mm$$

Javob: darslikning bir varag‘i qalinligi $0{,}01125\ mm$.

3. Chizg‘ich yordamida g‘ishtning diagonalini o‘lchay olasizmi?



G‘ishtning diagonalini chizg‘ich yordamida o‘lchash mumkin.Turli o‘lchamlarga ega bo‘lgan g‘ishtlar olinadi va o‘quvchilar guruhi g‘ishtning tomonlari va diagonalini o‘lchaydilar.

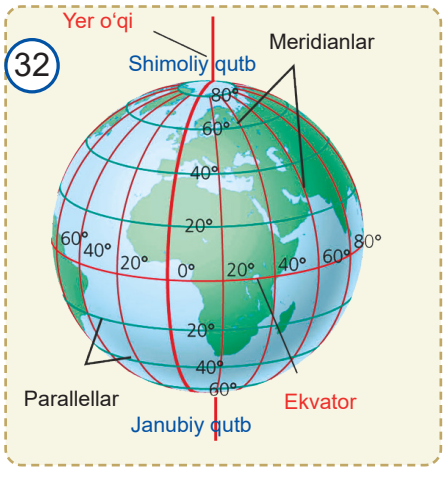
4. Sinfdoshlaringiz bo‘yini chamalab o‘lchang va taqqoslang. Bo‘yi eng uzun sinfdoshingizni aniqlang. Ikki sinfdoshingiz bo‘yini o‘zaro taqqoslashning amaliy usulini tushuntiring.

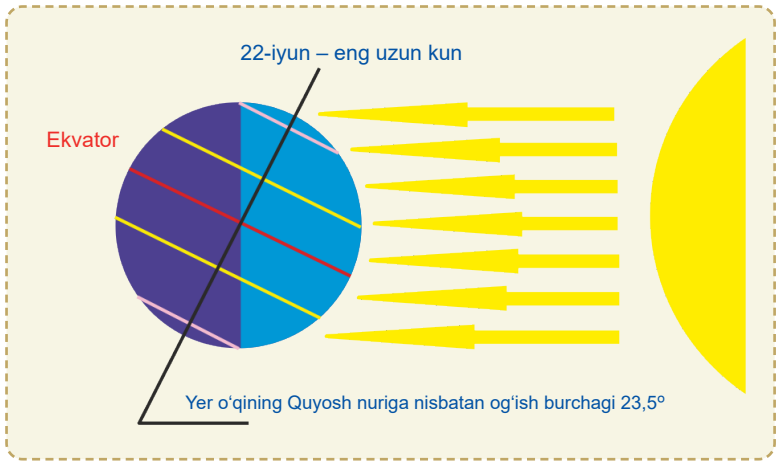
Bu ishni bajarish uchun sinf xonasida pol yuzidan sinf taxtasi (doska) gacha bo‘lgan masofa o‘lchanib yozib olinadi. So‘ng sinf taxtasiga vertikal to‘g‘ri chiziq chizib, u bo‘lmalarga ajratilib belgilanadi. Qarabsizki, o‘lchash asbobi tayyor. Sinfdoshlaringizni bo‘ylarini birin-ketin o‘lchab, aniqlab ularni taqqoslashingiz mumkin.

5. 30 santimetrlik chizg‘ich yordamida 1 metrlik kesmani qanday yasash mumkin?

30 santimetrlik chizg‘ich yordamida 1 metrlik kesmani yasash uchun sinf taxtasiga oldin to‘g‘ri chiziq chizib olinadi. To‘g‘ri chiziqning chap tomon uchi belgilanadi. Belgidan boshlab $30\ cm$ lik uzunlik uch marta o‘lchanib, to‘rtinchi marta o‘lchashda $10\ cm$ uzunlik belgilanadi va $1\ m$ lik kesma hosil qilinadi.

6. Yer shari o‘qi Quyoshdan tushayotgan nurga nisbatan 23,5° ga og‘gan holatda aylanadi *(31-rasm).* Yer 8 soatda o‘z o‘qi atrofda necha gradusga aylanadi? Yer necha soatda o‘z o‘qi atrofida 90° ga buriladi?





1) *Berilgan*: $\alpha = 360°;\ t = 24\ soat;\quad t_1 = 8\ soat;\quad Topish\ kerak:\ \alpha_1 = ?$

$$\alpha_1 = \frac{\alpha}{t} \cdot t_1 = \frac{360°}{24} \cdot 8 = \frac{360°}{3} = 120°. \qquad Javob:\ 120°.$$

2) *Berilgan*: $\alpha = 360°;\ t = 24\ soat;\quad \alpha_1 = 90°;\quad Topish\ kerak:\ t_1 = ?$

$$t_1 = \frac{\alpha_1 \cdot t}{\alpha} = \frac{90° \cdot 24}{360°} = \frac{24}{4} = 6\ soat. \qquad Javob:\ 6\ soat.$$

Uyga vazifa

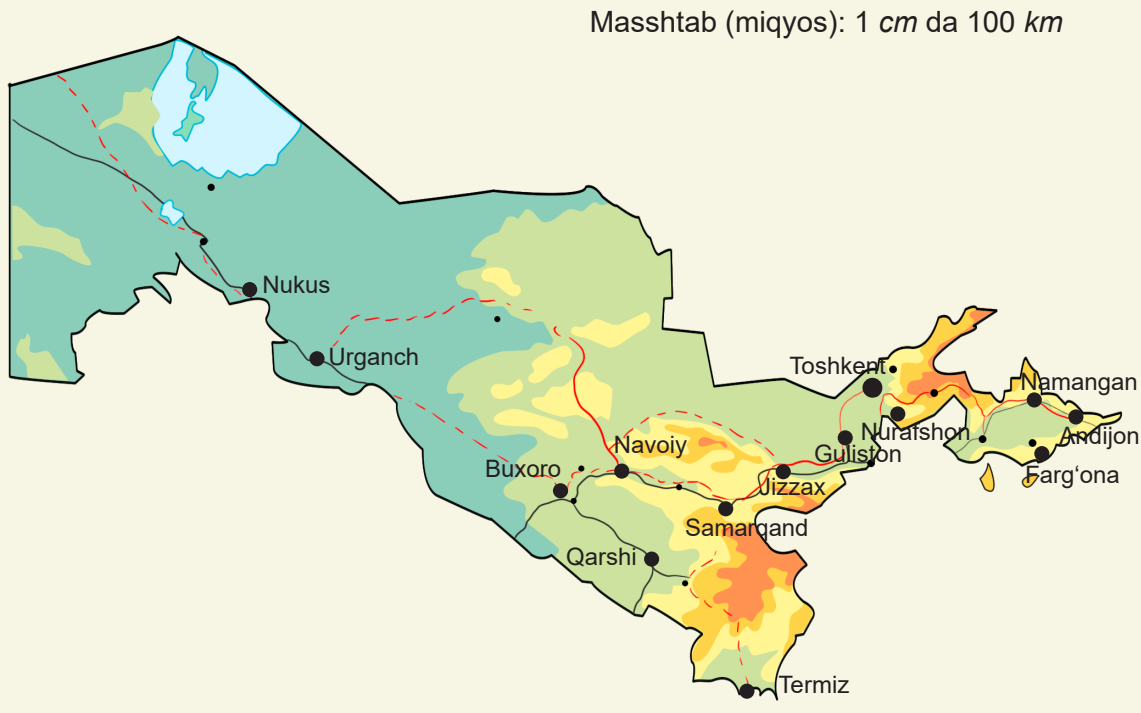
7. Agar bir chaqirim 900 m ekani ma’lum bo‘lsa, Buxoro va Samarqand shaharlari orasidagi masofani chaqirimlarda ifodalang.

221 km = 221 · 1000 m = 221 000 m; *221 000 : 900 = 245,555...≈246;*

Buxoro va Samarqand shaharlari orasidagi masofa 246 chaqirim.

8. O‘zbekiston xaritasidan berilgan masshtabga ko‘ra turli shaharlar orasidagi masofalarni toping.

33



Namuna: Toshkent va Buxoro shaharlari o‘rtasidagi masofani topish.

Xaritada shaharlar orasidagi masofani chizg‘ich yordamida o‘lchab, 4,07 cm ga teng ekanligini topamiz. Masshtabga ko‘ra, 4,07·100 km = 407 km ekanligini aniqlaymiz.

Javob: *407 km.*

a) Toshkent va Farg‘ona shaharlari o‘rtasidagi masofa: $1{,}48 \cdot 100\ km = 148\ km$.

b) Toshkent va Termiz shaharlari o‘rtasidagi masofa: $4{,}44 \cdot 100\ km = 444\ km$.

c) Toshkent va Jizzax shaharlari o‘rtasidagi masofa: $1{,}26 \cdot 100\ km = 126\ km$.

d) Toshkent va Guliston shaharlari o‘rtasidagi masofa: $0{,}9 \cdot 100\ km = 90\ km$.

e) Toshkent va Samarqand shaharlari o‘rtasidagi masofa: $1{,}83 \cdot 100\ km = 183\ km$.

f) Toshkent va Qarshi shaharlari o‘rtasidagi masofa: $2{,}8 \cdot 100\ km = 280\ km$.

g) Toshkent va Navoiy shaharlari o‘rtasidagi masofa: $3{,}19 \cdot 100\ km = 319\ km$.

h) Toshkent va Urganch shaharlari o‘rtasidagi masofa: $7{,}04 \cdot 100\ km = 704\ km$.

i) Toshkent va Qoraqalpag‘iston o‘rtasidagi masofa: $10{,}19 \cdot 100\ km = 1019\ km$.

Izoh: *xaritada shaharlar orasidagi masofani hisoblashda transport yo‘llari e’tiborga olinmagan. Lekin shaharlar orasidagi masofa ushbu hisoblangan masofadan kam emas.*

9. Televizor va kompyuter monitorlarining diagonali dyuymlarda o‘lchanadi. 15, 17 va 19 dyuymli monitorlar diagonalini santimetrlarda ifodalang.



Ko‘pgina davlatlarda xalqaro o‘lchov birliklaridan tashqari, quyidagi uzunlik o‘lchov birligi ham ishlatiladi: *1 dyuym = 2,54 cm.*

MAVZUGA OID QO‘SHIMCHA MASHQLAR

10. Rasmda berilgan ma’lumotlardan foydalanib Yerdan Quyoshgacha va boshqa sayyoralargacha bo‘lgan masofani toping va km larda ifodalang.



Ko‘pgina davlatlarda xalqaro o‘lchov birliklaridan tashqari quyidagi uzunlik o‘lchov birligi ham ishlatiladi: *1 mil = 1,609 km.*

1. Yerdan Quyoshgacha bo‘lgan masofa 93 mln mil, uni *km* da ifodalang.

93 mln mil = 93000000 · 1 mil = 93000000 · 1,609 km = 149637000 km.

2. Veneradan Quyoshgacha bo‘lgan masofa 67 mln mil, uni *km* da ifodalang.

67 mln mil = 67000000 · 1 mil = 67000000 · 1,609 km = 107803000 km.

3. Merkuriydan Quyoshgacha bo‘lgan masofa 36 mln mil, uni *km* da ifodalang.

36 mln mil = 36000000 · 1 mil=36000000·1,609 km=57924000 km.

4. Marsdan Quyoshgacha bo‘lgan masofa 141 mln mil, uni km da ifodalang.

141 mln mil = 141000000·1 mil = 141000000·1,609 km = 226869000 km.

5. Yupiterdan Quyoshgacha bo‘lgan masofa 483 mln mil, uni *km* da ifodalang.

483 mln mil = 483000000 · 1 mil = 483000000 · 1,609 km = 777147000 km.

6. Saturndan Quyoshgacha bo‘lgan masofa 887 mln mil, uni *km* da ifodalang.

887 mln mil = 887000000 · 1 mil = 887000000 · 1,609 km = 1427183000 km.

7. Urandan Quyoshgacha bo‘lgan masofa *1784 mln mil*, uni *km* da ifodalang.

1 784 mln mil = 1 784 000 000 · 1 mil = 1 784 000 000 · 1,609 km = 2 870 456 000 km.

8. Neptundan Quyoshgacha bo‘lgan masofa 2796 mln mil, uni *km* da ifodalang.

2796 mln mil = 2 796 000 000·1 mil = 2 796 000 000 · 1,609 km = 4 498 764 000 km.

11. Masofani tovush bilan o‘lchash. Dengizda suzayotgan kemani boshqarish uchun dengiz chuqurligini bilish juda muhimdir. Buning uchun dengiz tubiga ultratovush signali yuboriladi va uning dengiz tubiga urilib qancha vaqtda qaytib kelgani o‘lchanadi. Bu vaqtning yarmini tovushning suvdagi tezligi – 1490 m/s ga ko‘paytirib dengiz tubining chuqurligi aniqlanadi. Agar bu vaqt: a) 3; b) 10,5; c) 14,6 sekundni tashkil qilgani ma’lum bo‘lsa, dengiz chuqurligini toping.

a) Berilgan: $t = 3$ sekund; $v = 1490\ \frac{m}{s}$. Topish kerak: $S = ?$

$$S = \frac{t}{2} \cdot v = \frac{3\ s}{2} \cdot 1490 \frac{m}{s} = 3 \cdot 745\ m = 2235\ m.$$

Javob: *2235 m.*

b) Berilgan: $t = 10,5$ sekund; $v = 1490\ \frac{m}{s}$.

$$S = \frac{t}{2} \cdot v = \frac{10,5\ s}{2} \cdot 1490 \frac{m}{s} = 10,5 \cdot 745\ m = 7822,5\ m.$$

Javob: *78223,5 m.*

b) Berilgan: $t = 14,6$ sekund; $v = 1490\ \frac{m}{s}$. *Topish kerak:* $S = ?$

$$S = \frac{t}{2} \cdot v = \frac{14,6\ s}{2} \cdot 1490 \frac{m}{s} = 14,6 \cdot 745\ m = 10\,877\ m.$$

Javob: *10877 m.*

12. Hisoblang:

a) 34°18' + 53°38'; b) 15°8' 38″ + 113°21' 9″; c) 115°8'38″ - 113°21'9″.

Izoh: *1° = 60'; 1' = 60″.*

a) *34°18' + 53°38' = (34° + 53°) + (18' + 38') = 87° + 56' = 87° 56';*

b) *15°8' 38″ + 113°21' 9″ = (15° + 113°) + (8' + 21') + (38″ + 9″) =*

= 128° + 29' + 47″ = 128° 29' 47″;

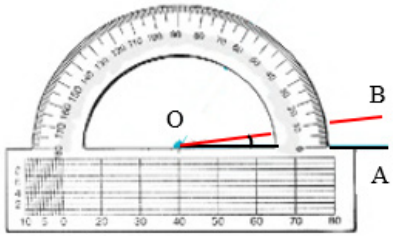
c) *115° 8' 38″ – 113° 21' 9″ = 114° + 1° + 8' + 38″ – (113° + 21' + 9″) =*

=114° + 60' + 8' + 38″ – (113° + 21' + 9″) =

=114° + 68' + 38″ - (113° + 21'+9″) =

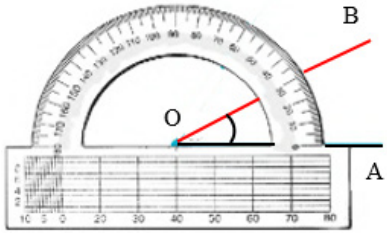
$=(114° - 113°) + (68' - 21') + (38'' - 9'') = 1° + 47' + 29'' = 1°47'\ 29''.$

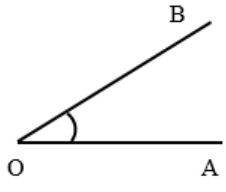
13. Transportir yordamida 10°, 30°, 74°45′, 113° 30′ va 165° li burchaklarni yasang.



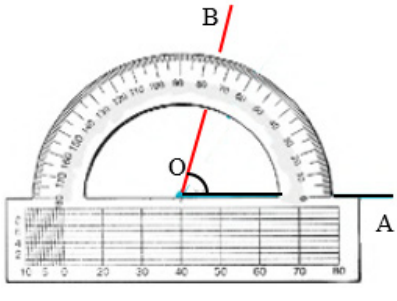


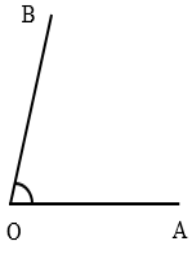
$\angle AOB = 10°$



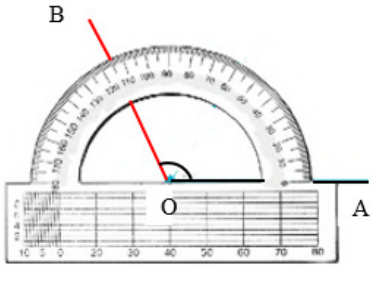


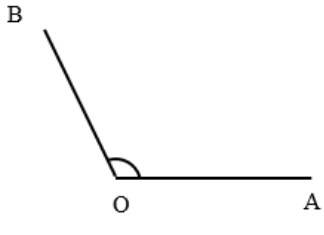
$\angle AOB = 30°$



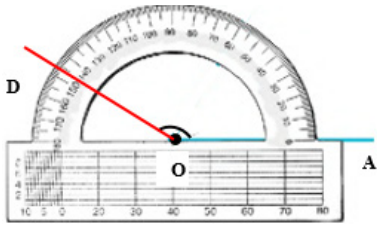


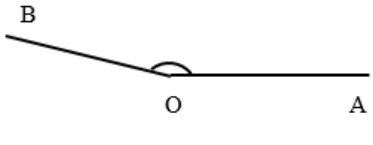
$\angle AOB = 74°\ 45'$





$\angle AOB = 113°\ 30'$

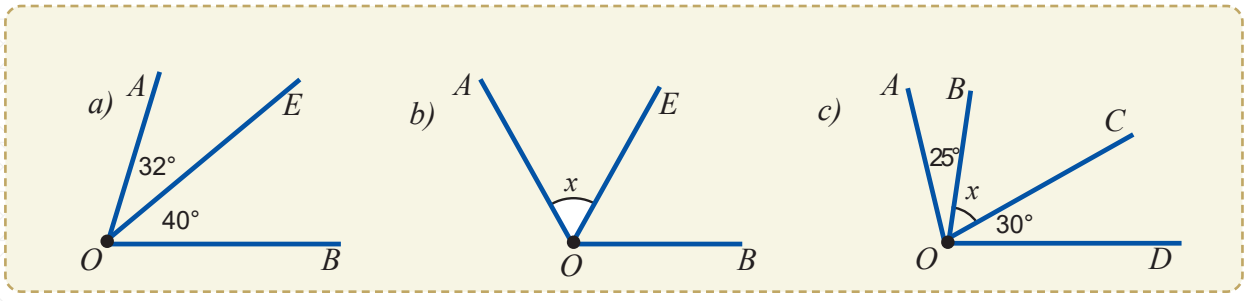




$\angle AOB = 165°$

14. Rasmdan foydalanib quyidagilarni aniqlang:

a) $\angle AOB = ?$; b) $\angle AOB = 120° 38'$, $x = ?$; c) $\angle AOD = 105° 45'$, $x = ?$



a) $\angle AOE = 32°$; $\angle BOE = 40°$; $\angle AOB = ?$

$\angle AOB = \angle AOE + \angle BOE = 32° + 40° = 72°.$

Javob: $\angle AOB = 72°.$

b) $\angle AOB = 120° 38'$; $\angle AOE = \angle BOE = x$; $x = ?$

$\angle AOE + \angle BOE = \angle AOB$; $x + x = \angle AOB$; $2x = 120° 38'$; $x = 60° 19'.$

Javob: $x = \angle AOE = BOE = 60°19'.$

c) $\angle AOD = 105° 45'$; $\angle AOE = 25°$; $\angle COD = 30°$; $\angle BOC = x = ?$

$\angle AOB + \angle BOC + \angle COD = \angle AOD$; $25° + x + 30° = 105° 45'$;

$55° + x = 105° 45'$; $x = 105° 45' - 55° = 50° 45'.$

Javob: $x = \angle AOC = 55° 45'.$

SUMMATIV BAHOLASH. 1–NAZORAT ISHI (2 soat)

1-nazorat ishi namunasi

1-variant

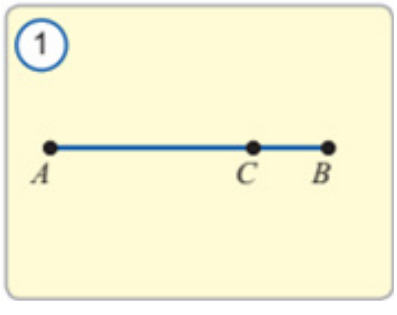
I. Nazariy qism

Nuqta, to‘g‘ri chiziq, tekislik va kesmaning ta’rifini keltiring. Ularning xossalarini yozing.

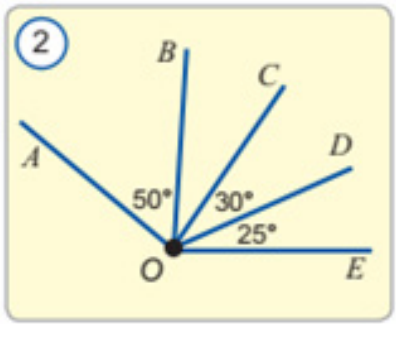
II. Amaliy qism

1. Bir to‘g‘ri chiziqda yotuvchi A, B va C nuqtalar uchun $AB = 9\ cm$, $AC = 12\ cm$ bo‘lsa, BC kesmaning uzunligi nimaga teng?

2. $AB = 48,\ AC = 3BC.\quad BC = ?$



3. Agar 2-rasmda $\angle AOE = 150°$ bo‘lsa, BOC burchakning gradus o‘lchovini toping.



4*. Soat 7^{00} bo‘lganda soat va minut millari (strelkalari) hosil qilgan burchak necha gradus bo‘ladi?

2-variant

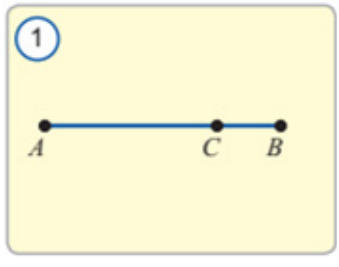
I. Nazariy qism

Nuqta, aylana, nur va burchakning ta’rifini keltiring. Ularning xossalarini yozing.

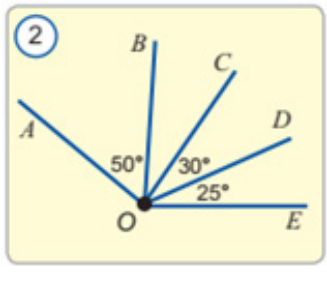
II. Amaliy qism

Bir to‘g‘ri chiziqda yotuvchi A, B va C nuqtalar uchun $AB = 12\ cm$, $AC = 18\ cm$ bo‘lsa, BC kesmaning uzunligi nimaga teng?

$AB = 50$, $AC = 4BC$. $BC = ?$ *(1-rasm)*



3. Agar 2-rasmda $\angle AOE = 140°$ bo‘lsa, BOC burchakning gradus o‘lchovini toping.



4*. Soat 5^{00} bo‘lganda soat va minut millari (strelkalari) hosil qilgan burchak necha gradus bo‘ladi?

BURCHAKNING TURLARI (2 soat)

1-DARS

I. Standartlar:

M7.GO‘.GSH.06. Burchaklarning turlarini biladi, burchak bissektrisasini ta’riflaydi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– burchaklarning turlarini farqlay olish;
– burchak bissektrisasini ta’riflay olish.

Ko‘nikmalar:

– burchak kattaligiga qarab turlarga ajrata oladi, burchaklarning bissektrisalari orasidagi burchakni topa oladi.

III. Dars mazmunining qisqacha tavsifi:

– burchaklarning turlarini, burchak bissektrisasi.

IV. Dars ashyolari va ko‘rgazmali qurollar:

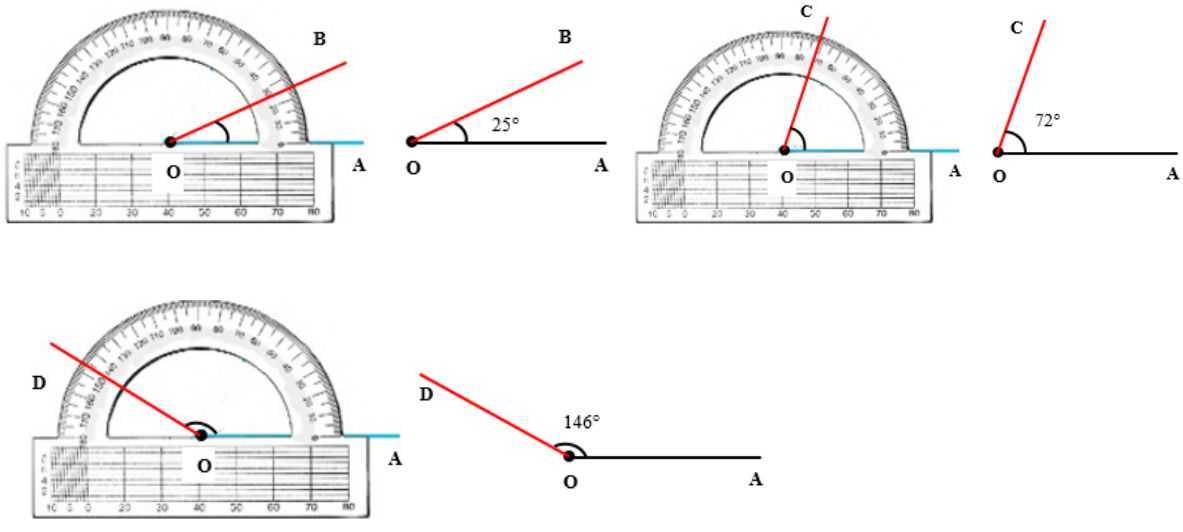
– transportir, qaychi, lavh.

V. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Burchaklarning turlarini ayting.	“Aqliy hujum”	Burchaklar kattaligiga qarab qanday turlarga ajratiladi?
Bilimlarni boyitish va mustahkamlash	Burchak bissektrisasiga ta’rif bering.	Darslikdagi 2-rasm bilan ishlash	Tevarak-atrofdan o‘tkir, o‘tmas va to‘g‘ri burchaklarga misollar keltiring.
	Burchak turini aniqlash	Amaliy mashg‘ulot bajarish	1. Darslikning 50-sahifasidagi 11-rasm bilan ishlash. 2. Amaliy mashq va tatbiq (2, 3, 4).
Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikning 50-sahifasidagi 5-, 6-, 7-amaliy mashqlarni bajarish.
Uyga vazifa	1. Darslikdagi 8-, 9-amaliy mashqlarni yechish. 2. Burchak turlarini daftarga tasvirlab kelish.		

Masalalar, yechimlari va ularga doir ko‘rsatmalar

1. OA nur chizing. Transportir yordamida gradus o‘lchovi mos ravishda 25°, 72° va 146° bo‘lgan AOB, AOC va AOD burchaklarni yasang.

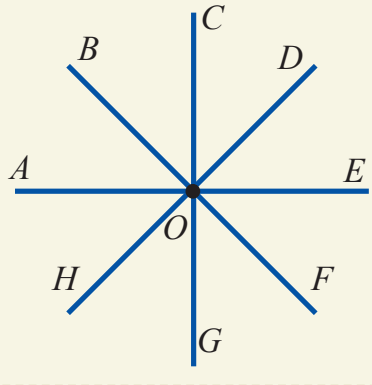


2. To‘g‘ri burchakning bissektrisasi uning bitta tomoni bilan qanday burchak hosil qiladi?

To‘g‘ri burchakning bissektrisasi uning bitta tomoni bilan 45° li o‘tkir burchak hosil qiladi.
Javob: 45° li burchak hosil qiladi.

3. OC nur – AOE burchakning bissektrisasi. OD esa COE burchakning bissektrisasi. AOB burchak DOC burchakdan necha marta katta?

Rasmda nechta: a) o‘tkir; b) o‘tmas; c) to‘g‘ri; d) yoyiq burchak bor?



OC nur AOE burchakning bissektrisasi bo‘lsa,

$$\angle AOB = \frac{\angle AOE}{4} = \frac{180^\circ}{4} = 45^\circ; \quad \angle AOB = 45^\circ;$$

OD nur COE burchakning bissektrisasi bo‘lsa,

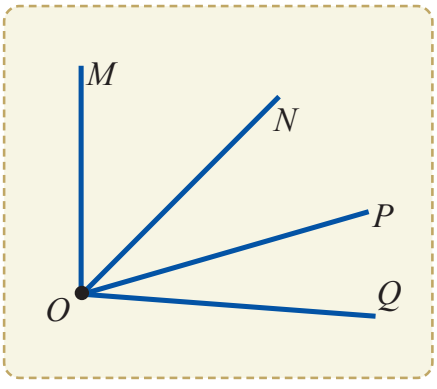
$$\angle DOC = \frac{\angle COE}{2} = \frac{90^\circ}{2} = 45^\circ; \quad \angle DOC = 45^\circ.$$

Javob: AOB burchak DOC burchakka teng.

a) O‘tkir burchaklar: $AOB, BOC, COD, DOE, EOF, FOG, GOH, AOH$.
Javob: 8 ta o‘tkir burchak bor.
b) O‘tmas burchaklar: $AOD, BOE, COF, DOG, EOH, FOA, GOB, HOC$.
Javob: 8 ta o‘tmas burchak bor.
c) To‘g‘ri burchaklar: $AOC, BOD, COE, DOF, EOG, FOH, GOA, HOB$.
Javob: 8 ta to‘g‘ri burchak bor.

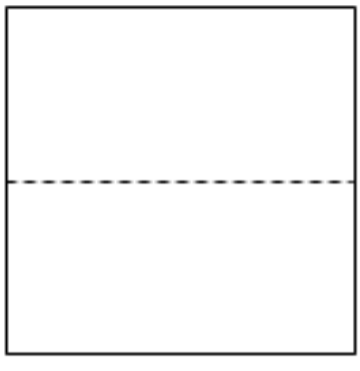
d) Yoyiq burchaklar: $AOE, BOF, COG, DOH, EOA, FOB, GOC, HOD$.
Javob: 8 ta yoyiq burchak bor.

4. Rasmda nechta o‘tkir va nechta o‘tmas burchak bor?

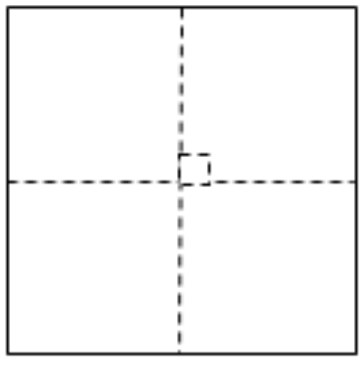


a) O‘tkir burchaklar: MON, NOP, POQ, MOP, NOQ.
Javob: 5 ta o‘tkir burchak hosil qiladi.
b) O‘tmas burchaklar: MOQ.
Javob: 1 ta o‘tmas burchak hosil qiladi.

5. Qog‘oz varag‘ini buklab to‘g‘ri burchak hosil qila olasizmi?



1-buklash



2-buklash

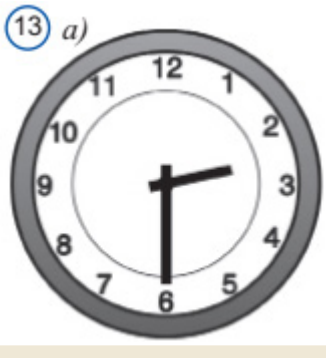
Qog‘oz varag‘ini ikki marta ketma-ket teng buklash orqali to‘g‘ri burchak hosil qilish mumkin.

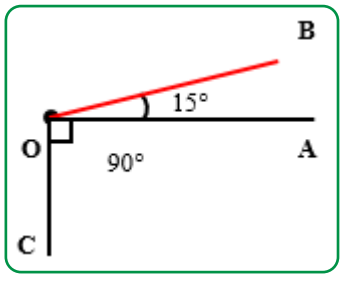
6. Soatning soat va minut millari to‘g‘ri burchak hosil qiladigan vaqtlardan bir nechtasini ayting.

Soatning soat va minut millari to‘g‘ri burchak hosil qiladigan vaqtlar: 3^{00}, 9^{00}, 15^{00}, 21^{00}.

Uyga vazifa

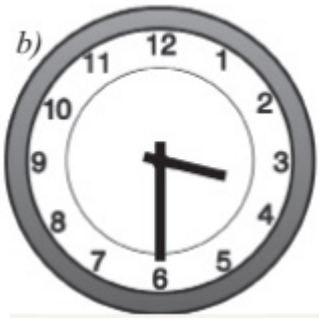
7. Soatning minut va soat millari hosil qilgan burchaklarni toping *(13-rasm)*.

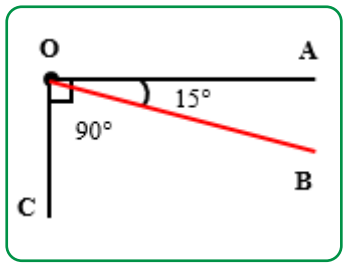




a) Soat 2^{30}, $\angle AOB = 15°$, $\angle AOC = 90°$.
Topish kerak: $\angle BOC = ?$
$\angle BOC = \angle AOB + \angle AOC =$
$= 15° + 90° = 105°$.
Javob: $\angle BOC = 105°$,

Soat $2^{30} = 105°$.





b) Soat 3^{30}, $\angle AOB = 15°$, $\angle AOC = 90°$.

Topish kerak: $\angle BOC = ?$

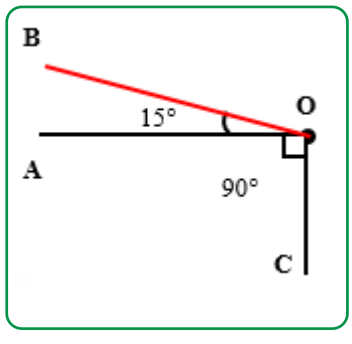
$\angle BOC = \angle AOC - \angle AOB =$

$= 90° - 15° = 75°$.

Javob: $\angle BOC = 75°$,

Soat $3^{30} = 75°$.





b) Soat 9^{30}, $\angle AOB = 15°$, $\angle AOC = 90°$.

Topish kerak: $\angle BOC = ?$

$\angle BOC = \angle AOC + \angle AOB =$

$= 90° + 15° = 105°$.

Javob: $\angle BOC = 105°$,

Soat $9^{30} = 105°$.

8*. Soatning soat mili: a) 1 soatda; b) 6 soatda; c) 2 minutda necha gradusga buriladi?

$a)\ \alpha = 1\ soat; \qquad n = 12; \qquad \alpha_1^\circ = \frac{360°}{n} \cdot \alpha = \frac{360°}{12} \cdot 1 = 30° \cdot 1 = 30°.$

Javob: Soatning mili 1 soatda 30^o ga buriladi.

$b)\ \alpha = 6\ soat; \qquad n = 12; \qquad \alpha_1^\circ = \frac{360°}{n} \cdot \alpha = \frac{360°}{12} \cdot 6 = 30° \cdot 6 = 180°.$

Javob: Soatning mili 6 soatda 180^o ga buriladi.

$c)\ \alpha = 2\ minut = \frac{1}{30}; \qquad n = 12; \qquad \alpha_1^\circ = \frac{360°}{n} \cdot \alpha = \frac{360°}{12} \cdot \frac{1}{30} = \frac{12°}{12} = 1°.$

Javob: Soatning mili 2 soatda 1^o ga buriladi.

2-DARS

I. Standartlar:

M7.GO‘.GSH.07. Qo‘shni va vertikal burchaklarni ta’riflay oladi va ularning xossalarini biladi va isbotlay oladi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– qo‘shni va vertikal burchaklarni ta’riflay olish;
– ularning xossalarini bilish va isbotlay olish.

Ko‘nikmalar:

– vertikal burchak xossalarini biladi, teorema va isbot tushunchalarini anglaydi;

III. Dars mazmunining qisqacha tavsifi:

– qo‘shni va vertikal burchaklar;
– geometriyani o‘rganishda fikrlar ketma-ketligi va bog‘liqligi;
– teorema va isbot tushunchalari. Ta’rif, boshlang‘ich tushuncha va aksiomalar.

IV. Dars ashyolari va ko‘rgazmali qurollar:

– transportir, qaychi, lavh.

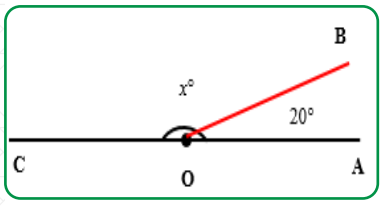
V. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Qo‘shni burchaklar o‘zaro teng bo‘lishi mumkinmi? Qachon?	“Aqliy hujum”	Qanday burchaklar qo‘shni burchaklar deyiladi? Qo‘shni burchaklarning yig‘indisi nimaga teng?
Bilimlarni boyitish va mustahkamlash	Geometriyani o‘rganishda fikrlar ketma-ketligi va bog‘liqligi	Darslikning 47-, 48-sahifa-laridagi tarixiy ma’lumot bilan tanishish	Yunon olimi Platon geometriyada payqagan ajoyib qonuniyat nima?
	Geometriyada analogiyalar	Amaliy mashg‘ulot bajarish	1. Darslikning 49-sahifasidagi 7-, 8-rasmlar bilan ishlash; 2. Amaliy mashq va tatbiq (10, 11, 12, 13, 14, 15).
Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikning 50-sahifasidagi 3-, 4-, 5-, 6-, 7-, 8-, 9-, 10-, 11-savollarga javob berish

Uyga vazifa	1. Darslikdagi 12-, 13-, 14-savollarga javob berish. 2. Darslikdagi 21-, 22-, 23-, 24-, 25-amaliy mashqlarni yechish.

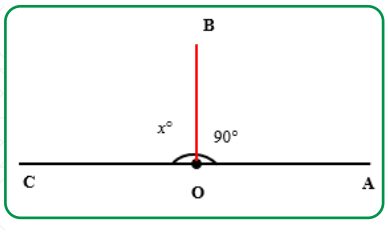
Masalalar, yechimlari va ularga doir ko‘rsatmalar

1. a) 20°; b) 90°; c) 145°; d) 9° li burchakka qo‘shni bo‘lgan burchak necha gradusli bo‘ladi?



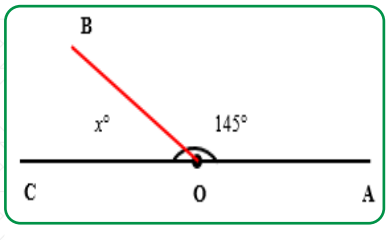
a) $\angle AOB = 20°;\ \angle AOC = 180°.$
Topish kerak: $\angle BOC = ?$
$\angle AOB + \angle BOC = \angle AOC;\ \ 20° + \angle BOC = 180°;$
$\angle BOC = 180° - 20° = 160°.$

Javob: Qo‘shni burchak $\angle BOC = 160°.$



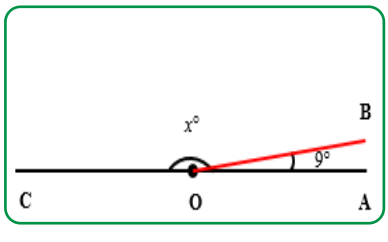
b) $\angle AOB = 90°;\ \angle AOC = 180°.$
Topish kerak: $\angle BOC = ?$
$\angle AOB + \angle BOC = \angle AOC;\ \ 90° + \angle BOC = 180°;$
$\angle BOC = 180° - 90° = 90°.$

Javob: Qo‘shni burchak $\angle BOC = 90°.$



c) $\angle AOB = 145°;\ \ \angle AOC = 180°.$
Topish kerak: $\angle BOC = ?$
$\angle AOB + \angle BOC = \angle AOC;\ \ 145° + \angle BOC = 180°;$
$\angle BOC = 180° - 145° = 35°.$

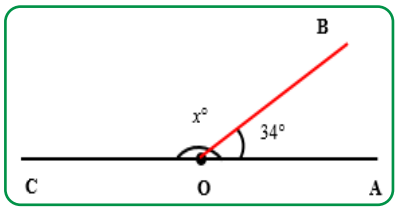
Javob: Qo‘shni burchak $\angle BOC = 35°.$



d) $\angle AOB = 9°;\ \ \angle AOC = 180°.$
Topish kerak: $\angle BOC = ?$
$\angle AOB + \angle BOC = \angle AOC;\ \ 9° + \angle BOC = 180°;$
$\angle BOC = 180° - 9° = 171°.$

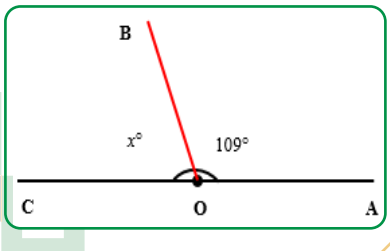
Javob: Qo‘shni burchak $\angle BOC = 171°.$

2. a) 34°; b) 109°; c) 5°; d) 167° li burchakka qo‘shni bo‘lgan burchak necha gradusli bo‘ladi?



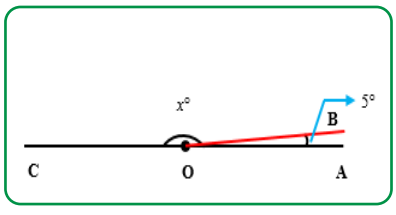
a) $\angle AOB = 34°;\ \ \angle AOC = 180°.$
Topish kerak: $\angle BOC = ?$
$\angle AOB + \angle BOC = \angle AOC;\ \ 34° + \angle BOC = 180°;$
$\angle BOC = 180° - 34° = 146°.$

Javob: Qo‘shni burchak $\angle BOC = 146°.$

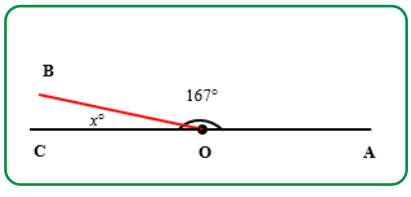


b) $\angle AOB = 109°;\ \angle AOC = 180°.$
Topish kerak: $\angle BOC = ?$

$\angle AOB + \angle BOC = \angle AOC;\ 109° + \angle BOC = 180°;$
$\angle BOC = 180° - 109° = 71°.$
Javob: Qo‘shni burchak $\angle BOC = 71°$.

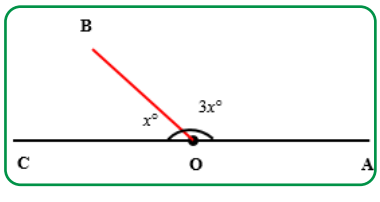


c) $\angle AOB = 5°;\quad \angle AOC = 180°.$
Topish kerak: $\angle BOC = ?$
$\angle AOB + \angle BOC = \angle AOC;\quad 5° + \angle BOC = 180°;$
$\angle BOC = 180° - 5° = 175°.$
Javob: Qo‘shni burchak $\angle BOC = 175°$.



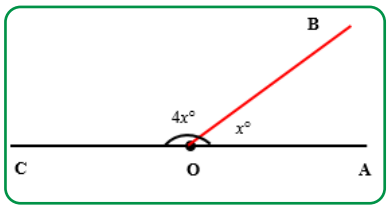
d) $\angle AOB = 167°;\ \angle AOC = 180°.$
Topish kerak: $\angle BOC = ?$
$\angle AOB + \angle BOC = \angle AOC;\quad 167° + \angle BOC = 180°;$
$\angle BOC = 180° - 167° = 13°.$
Javob: Qo‘shni burchak $\angle BOC = 13°$.

3. Agar qo‘shni burchaklarning biri ikkinchisidan uch marta katta bo‘lsa, ularni toping.



$\angle AOB = 3x;\quad \angle BOC = x,\ \angle AOC = 180°.$
$\angle AOB + \angle BOC = \angle AOC;\quad 3x + x = 180°;$
$4x = 180°;\quad x = 45°;\quad \angle BOC = 45°;$
$\angle AOB = 3x = 3 \cdot 45° = 135°.$
Javob: $\angle AOB = 135°,\ \angle BOC = 45°.$

4. Agar qo‘shni burchaklarning biri ikkinchisidan to‘rt marta kichik bo‘lsa, ularni toping.



$\angle AOB = x;\quad \angle BOC = 4x,\ \angle AOC = 180°.$
$\angle AOB + \angle BOC = \angle AOC;\ x + 4x = 180°;$
$5x = 180°;\quad x = 36°;\ \angle AOB = 36°;$
$\angle BOC = 4x = 4 \cdot 36° = 144°.$
Javob: $\angle AOB = 36°,\ \angle BOC = 144°.$

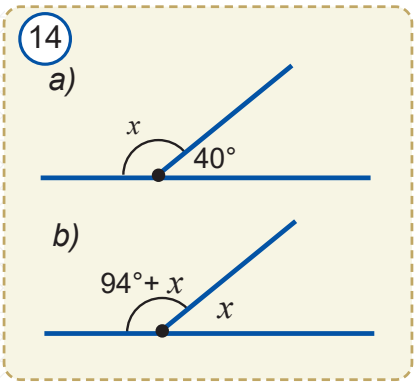
5*. Qo‘shni burchaklarning ikkalasi ham: a) o‘tkir; b) to‘g‘ri; c) o‘tmas burchaklar bo‘la oladimi?

a) Qo‘shni burchaklarning ikkalasi ham o‘tkir burchaklar bo‘la olmaydi.

b) Qo‘shni burchaklarning ikkalasi ham to‘g‘ri burchaklar bo‘la oladi.

c) Qo‘shni burchaklarning ikkalasi ham o‘tmas burchaklar bo‘la olmaydi.

6. Rasmdagi noma’lum x burchakni toping.



a) $\angle AOB = 40°$; $\angle BOC = x$, $\angle AOC = 180°$.
$\angle AOB + \angle BOC = \angle AOC$;
$40° + x = 180°$; $x = 180° - 40° = 140°$;
Javob: $BOC = 140°$.

b) $\angle AOB = x$; $\angle BOC = 94° + x$, $\angle AOC = 180°$.
$\angle AOB + \angle BOC = \angle AOC$;
$x + 94° + x = 180°$; $2x = 180° - 94°$; $2x = 86°$; $x = 43°$.
$94° + x = 94° + 43° = 137°$. $\angle AOB = x = 43°$, $\angle BOC = 94° + x = 137°$.
Javob: $\angle AOB = 43°$, $\angle BOC = 137°$.

15. Agar qo‘shni burchaklar gradus o‘lchovlari nisbati a) 2 : 7; b) 11 : 25; c) 1 : 9 bo‘lsa, ularni toping.

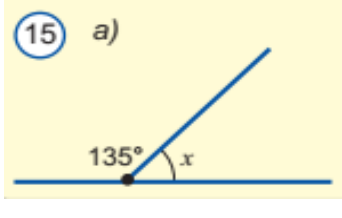
a) $\angle AOB = 2x$; $\angle BOC = 7x$; $\angle AOC = 180°$. $\angle AOB = ?$; $\angle BOC = ?$
$\angle AOB + \angle BOC = \angle AOC$; $2x + 7x = 180°$; $9x = 180°$; $x = 20°$.
$\angle AOB = 2x = 2 \cdot 20° = 40°$; $\angle BOC = 7x = 7 \cdot 20° = 140°$.
Javob: $\angle AOB = 40°$; $\angle BOC = 140°$.

b) $\angle AOB = 11x$; $\angle BOC = 25x$; $\angle AOC = 180°$. $\angle AOB = ?$; $\angle BOC = ?$
$\angle AOB + \angle BOC = \angle AOC$; $11x + 25x = 180°$; $36x = 180°$; $x = 5°$.
$\angle AOB = 11x = 11 \cdot 5° = 55°$; $\angle BOC = 25x = 25 \cdot 5° = 125°$.
Javob: $\angle AOB = 55°$; $\angle BOC = 125°$.

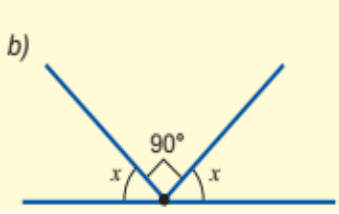
c) $\angle AOB = x$; $\angle BOC = 9x$; $\angle AOC = 180°$. $\angle AOB = ?$; $\angle BOC = ?$
$\angle AOB + \angle BOC = \angle AOC$; $x + 9x = 180°$; $10x = 180°$; $x = 18°$.
$\angle AOB = x = 18°$; $\angle BOC = 9x = 9 \cdot 18° = 162°$.
Javob: $\angle AOB = 18°$; $\angle BOC = 162°$

Uyga vazifa

8. Rasmdagi noma’lum x burchakni toping.



a) $\angle AOB = x$; $\angle BOC = 135°$, $\angle AOC = 180°$.
$\angle AOB + \angle BOC = \angle AOC$; $x + 135° = 180°$;
$x = 180° - 135° = 45°$.
Javob: $AOB = 45°$.

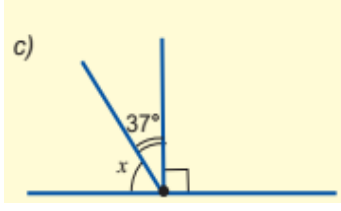


b) $\angle AOB = x;\ \angle BOC = 90°;\ \angle COD = x;\ \angle AOD = 180°.$

$\angle AOB + \angle BOC + \angle COD = \angle AOD;\ x+90°+x = 180°;$

$x = \frac{180° - 90°}{2} = \frac{90°}{2} = 45°.$

Javob: $AOB = COD = 45°.$



c) $\angle AOB = 90°;\ \angle BOC = 37°;\ \angle COD = x;\ \angle AOD = 180°.$

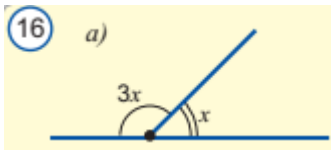
$\angle AOB + \angle BOC + \angle COD = \angle AOD;$

$90° + 37° + x = 180°;$

$x = 180° - 127° = 53°.$

Javob: $COD = 53°.$

9*. Rasmdagi noma'lum x burchakni toping.



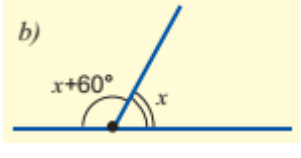
a) $\angle AOB = x;\quad \angle BOC = 3x,\ \angle AOC = 180°.$

$\angle AOB + \angle BOC = \angle AOC;\quad x + 3x = 180°;$

$4x = 180°;\ x = 45°;\ \angle AOB = 45°;$

$\angle BOC = 3x = 3 \cdot 45° = 135°.$

Javob: $\angle AOB = 45°,\ \angle BOC = 135°.$



b) $\angle AOB = x;\quad \angle BOC = x + 60°,\quad \angle AOC = 180°.$

$\angle AOB + \angle BOC = \angle AOC;\quad x + x + 60° = 180°;$

$2x = 180°\text{-}60°;\quad 2x = 120°;\quad x = 60°.$

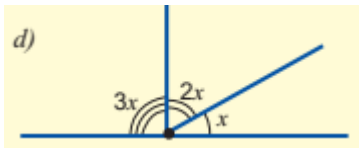
$x + 60° = 60°+60° = 120°.\quad \angle AOB = x = 60°,\quad \angle BOC = x + 60° = 120°.$

Javob: $\angle AOB = 60°,\ \angle BOC = 120°.$

$x + 2x + 3x = 180°;\quad 6x = 180°;\quad x = 30°;\quad 2x = 2 \cdot 30° = 60°;$

$3x = 3 \cdot 30° = 90°.$

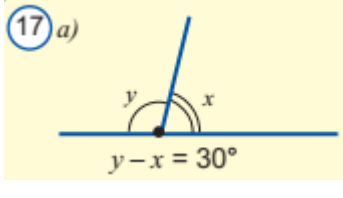
Javob: $AOB = 30°;\ BOC = 60°;\ COD = 90°.$



d) $\angle AOB = x;\ \angle BOC = 2x;\ \angle COD = 3x;$

$\angle AOD = 180°.\ \angle AOB + \angle BOC + \angle COD = \angle AOD;$

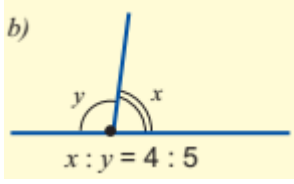
10*. Rasmga qarab masalalar tuzing va uni yeching.



a) Qo'shni burchaklarning ikkinchisidan birinchisi ayirmasining 30° dan iborat bo'lsa, shu burchaklarni toping.

$$\begin{cases} y - x = 30° \\ x + y = 180° \end{cases} \rightarrow \begin{cases} y = 30° + x \\ x + y = 180° \end{cases} \rightarrow x + 30° + x = 180°;$$

$2x + 30° = 180°;\quad 2x = 180° - 30°;\quad 2x = 150°;\quad x = 75°;$
$y = 30° + x = 30° + 75° = 105°.$ Javob: $x = 75°;\quad y = 105°.$

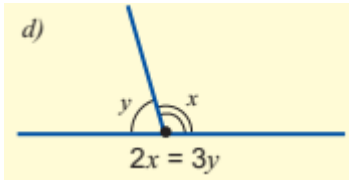


b) Qo‘shni burchaklar nisbati 4:5 bo‘lsa, shu burchaklarni toping.

$$\begin{cases} \frac{x}{y} = \frac{4}{5} \\ x + y = 180° \end{cases} \rightarrow \begin{cases} y = \frac{5x}{4} \\ x + y = 180° \end{cases} \rightarrow x + \frac{5x}{4} = 180°;$$

$$5x + 4x = 180° \cdot 4; \qquad 9x = 720°; \qquad x = \frac{720°}{9}; \qquad x = 80°;$$

$$y = \frac{5x}{4} = \frac{5 \cdot 80°}{4} = 100°. \qquad Javob: \quad x = 80°; \quad y = 100°.$$



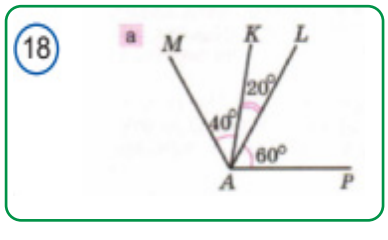
d) Qo‘shni burchaklar birinchisining ikkilangani, ikkinchi burchakning uchlanganligiga teng bo‘lsa, shu burchaklarni toping.

$$\begin{cases} 2x = 3y \\ x + y = 180° \end{cases} \rightarrow \begin{cases} y = \frac{2x}{3} \\ x + y = 180° \end{cases} \rightarrow x + \frac{2x}{3} = 180°;$$

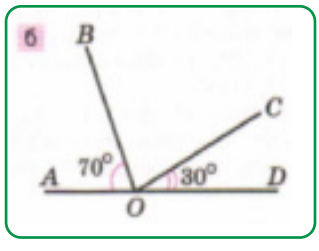
$$3x + 2x = 180° \cdot 3; \qquad 5x = 540°; \qquad x = \frac{540°}{5}; \qquad x = 108°;$$

$$y = \frac{2x}{3} = \frac{2 \cdot 108°}{3} = 2 \cdot 36° = 72°. \qquad Javob: \quad x = 108°; \quad y = 72°.$$

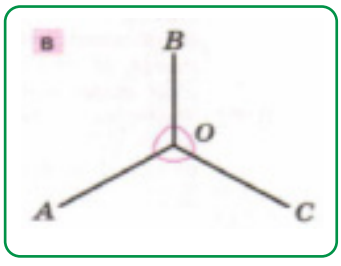
11. Rasmdagi burchaklarning gradus o‘lchovlarini toping.



a) $\angle MAK = 40°;\quad \angle KAL = 20°;\quad \angle LAP = 60°.$
Topish kerak: $\angle MAP = ?$
$\angle MAP = \angle MAK + \angle KAL + \angle LAP =$
$= 40° + 20° + 60° = 120°.$
Javob: $\angle MAP = 120°.$



Berilgan: $\angle AOB = 70°;\quad \angle COD = 30°;\quad \angle AOD = 180°.$
Topish kerak: $\angle BOC = ?$
$\angle AOB + \angle BOC + \angle COD = \angle AOD;$
$70° + \angle BOC + 30° = 180°.\quad \angle BOC = 180° - 100°;$
$\angle BOC = 80°.$
Javob: $\angle BOC = 80°.$



$\angle AOB = \angle BOC = \angle AOC = x$.

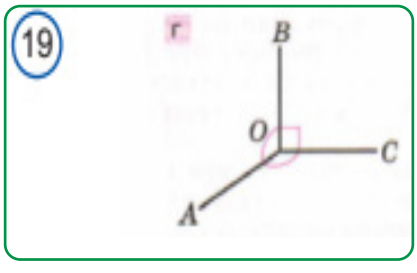
Topish kerak: $\angle AOB = ?,\ \angle BOC=?,\ \angle AOC = ?$

$\angle AOB + \angle BOC+\angle AOC = 180°;$

$x + x + x = 180°;\ 3x = 180°;\ x = 60°;$

Javob: $\angle AOB = 60°, \angle BOC = 60°,\ \angle AOC = 60°.$

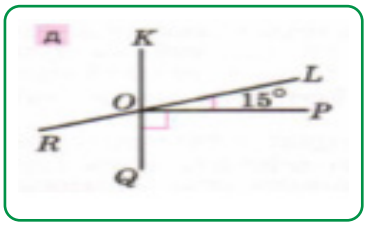
25. 19-rasmdagi burchaklarning gradus o‘lchovlarini toping.



$\angle BOC = 90°;\ \angle AOC = \angle AOB = x.$

$x + x + 90° = 360°;\ 2x = 270°;\ x = 135°;$

Javob: $\angle AOC = 135°; \angle AOB = 135°; \angle BOC = 90°$



Berilgan: $\angle POL = 15°;\ \angle POQ = 90°.$

Topish kerak: $\angle LOK = ?,\ \angle KOR = ?,\ \angle ROQ = ?$

$\angle LOK + \angle LOP + \angle POQ = \angle KOQ;$

$\angle LOK + 15°+90° = 180°;\ \angle LOK + 105° = 180°;$

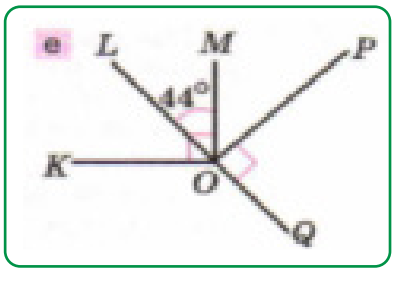
$\angle LOK = 180°-105°;$

$\angle LOK = 75°;\ \angle LOP + \angle POQ+\angle ROQ = \angle LOR;\ 15° + 90° + \angle ROQ = 180°;$

$105° + \angle ROQ = 180°;\ \angle ROQ = 180°-105° = 75°;$

$\angle LOK + \angle KOR = \angle LOR;\ 75° + \angle KOR = 180°;\ \angle KOR = 180° – 75° = 105°;$

Javob: $\angle LOK = 75°,\ \angle KOR = 105°,\ \angle ROQ = 75°.$



Berilgan: $\angle KOM = \angle POQ = 90°;\ \angle LOM = 44°.$

Topish kerak: $\angle KOL = ?,\ \angle MOP = ?,\ \angle KOQ = ?$

$\angle KOL = \angle KOM-\angle LOM = 90° – 44° = 46°;$

$\angle KOL + \angle KOQ = \angle LOQ;\ 46° + \angle KOQ = 180°;$

$\angle KOQ = 180°-46° = 134°;$

$\angle LOM + \angle MOP + \angle POQ = \angle LOQ;$

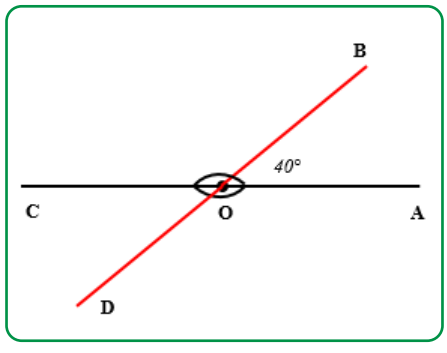
$44° + \angle MOP + 90° = 180°;$

$\angle MOP + 134° = 180°;\ \angle MOP = 180° – 134° = 46°.$

Javob: $\angle KOL = 46°,\ \angle MOP = 46°,\ \angle KOQ = 134°.$

MAVZUGA OID QO‘SHIMCHA MASHQLAR

1. Agar ikki to‘g‘ri chiziqning kesishishidan hosil bo‘lgan burchaklardan biri 40° bo‘lsa, qolgan burchaklarni toping.



Berilgan: $\angle AOB = 40°$.

Topish kerak: $\angle BOC = ?$, $\angle COD = ?$, $\angle AOD = ?$

Vertikal burchaklar teng. $\angle AOB = \angle COD$.

$\angle BOC = \angle AOD$. $\angle AOB = \angle COD = 40°$;

$\angle BOC = 180° - \angle AOB = 180° - 40° = \angle 140°$.

$\angle BOC = \angle AOD = 140°$.

Javob: $140°;\ 40°;\ 140°$.

2. $\angle 1$ va $\angle 2$ qo‘shni burchaklar. Quyidagi jadvalni to‘ldiring:

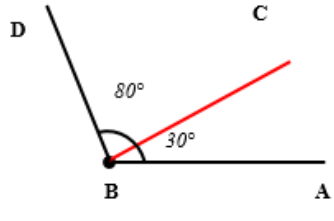
$\angle 1$	34°			19°	175°
$\angle 2$		118°	132°		

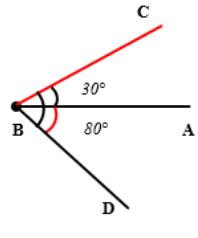
Javobi:

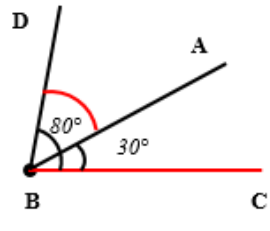
$\angle 1$	34°	62°	48°	19°	175°
$\angle 2$	146°	118°	132°	161°	5°

1) $\angle 2 = 180° - \angle 1 = 180° - 34° = 146°$;
2) $\angle 1 = 180° - \angle 2 = 180° - 118° = 62°$;
3) $\angle 1 = 180° - \angle 2 = 180° - 132° = 48°$;
4) $\angle 2 = 180° - \angle 1 = 180° - 19° = 161°$;
5) $\angle 2 = 180° - \angle 1 = 180° - 175° = 5°$.

3*. $\angle ABC = 30°$, $\angle CBD = 80°$. $\angle ABD$ ni toping. Hamma hollarni ko‘ring.







1) $\angle ABC = 30°$, $\angle CBD = 80°$. $\angle ABD = ?$

$\angle ABD = \angle ABC + \angle CBD = 30° + 80° = 110°$.

Javob: $\angle ABD = 110°$

2) $\angle ABC = 30°$, $\angle CBD = 80°$. $\angle ABD = ?$

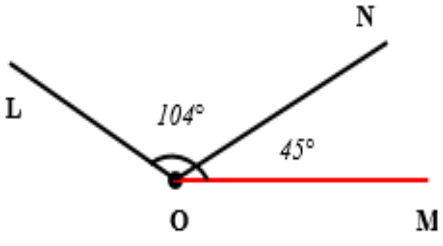
$\angle ABD = \angle CBD - \angle ABC = 80° - 30° = 50°$.

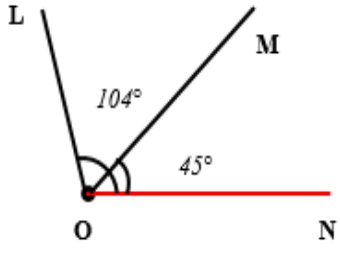
Javob: $\angle ABD = 50°$

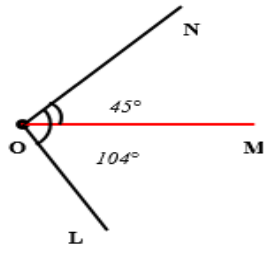
3) $\angle ABC = 30°, \quad \angle CBD = 80°. \quad \angle ABD = ?$

$\angle ABD = \angle CBD - \angle ABC = 80° - 30° = 50°.$ Javob: $\angle ABD = 50°$

4*. $\angle MON = 45°$, $\angle NOL = 104°$. $\angle MOL$ ni toping. Hamma hollarni ko‘ring.







a) $\angle MON = 45°, \quad \angle NOL = 104°. \quad \angle MOL = ?$

$\angle MOL = \angle MON + \angle NOL = 45° + 104° = 149°.$ Javob: $\angle MOL = 149°.$

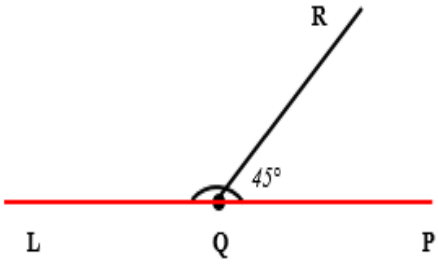
b) $\angle MON = 45°, \quad \angle NOL = 104°. \quad \angle MOL = ?$

$\angle MOL = \angle NOL - \angle MON = 104° - 45° = 59°.$ Javob: $\angle MOL = 59°.$

c) $\angle MON = 45°, \quad \angle NOL = 104°. \quad \angle MOL = ?$

$\angle MOL = \angle NOL - \angle MON = 104° - 45° = 59°.$ Javob: $\angle MOL = 59°.$

5*. Transportir yordamida $\angle PQR = 45°$ burchakni yasang. Bu burchakka qo‘shni va QR tomon umumiy bo‘lgan qo‘shni burchakni yasang va uning gradus o‘lchovini toping.



Berilgan: $\angle PQR = 45°; \quad \angle LMK = 180°.$

Topish kerak: $\angle RQL = ?$

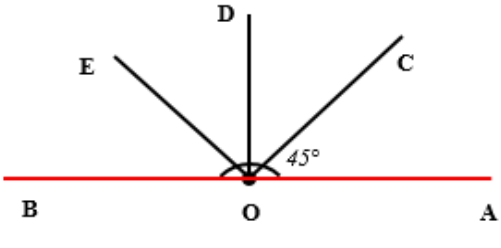
$\angle PQR + \angle RQL = \angle PQL;$

$45° + \angle RQL = 180°;$

$\angle RQL = 180° - 45° = 135°.$

Javob: $\angle RQL = 135°.$

6. AOB burchak OC, OD va OE nurlar bilan to‘rtta teng burchakka bo‘lingan. Bu nurlar qaysi burchaklarning bissektrisasi bo‘ladi?



$\angle AOC = \angle COD = \angle DOE = \angle BOE = 45°.$

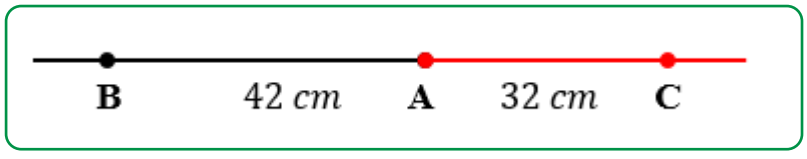
1) OC nur $\angle AOD$ ning bissektrisasi;

2) OD nur $\angle AOB$ ning bissektrisasi;

3) OE nur $\angle BOD$ ning bissektrisasi.

7*. To‘g‘ri chiziqda A, B va C nuqtalar berilgan. Agar $AB = 42\ cm$, $AC = 3\ dm\ 2\ cm$ va $BC = 74\ cm$ bo‘lsa, bu nuqtalarning qaysi biri qolganlarining orasida yotadi? Javobingizni asoslang.

Berilgan: $AB = 42\ cm;\ \ AC = 3\ dm\ 2\ cm = 32\ cm;\ \ BC = 74\ cm.$



$AB + AC = BC;\ \ 42\ cm + 32\ cm = 74\ cm.$

Javob: A nuqta B va C nuqtalar orasida yotadi.

PERPENDIKULYAR TO‘G‘RI CHIZIQLAR. (2 soat)

1-DARS

I. Standartlar:

M7.GO‘.GSH.08. Perpendikulyar to‘g‘ri chiziqlarni tasavvur qila oladi va tasvirlay oladi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– perpendikulyar to‘g‘ri chiziqlarni tasavvur qila olish;
– ularni tasvirlay olish.

Ko‘nikmalar:

– to‘g‘ri chiziqning ixtiyoriy nuqtasidan shu to‘g‘ri chiziqqa perpendikulyar to‘g‘ri chiziq o‘tkaza oladi.

III. Dars mazmunining qisqacha tavsifi:

– perpendikulyar to‘g‘ri chiziqlar;
– teskarisini faraz qilib isbotlash usuli;
– perpendikulyar va og‘ma.

IV. Dars ashyolari va ko‘rgazmali qurollar:

– transportir, chizg‘ich.

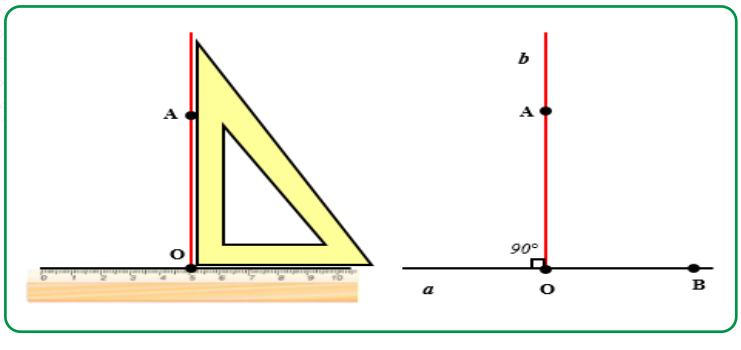
V. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Qanday to‘g‘ri chiziqlar perpendikulyar to‘g‘ri chiziqlar deb ataladi?	“Aqliy hujum”	Qachon to‘g‘ri chiziqlar perpendikulyar deyiladi? Javobingizni chizmada sharhlang.
Bilimlarni boyitish va mustahkamlash	Teskarisini faraz qilib isbotlash usuli qanday?	Darslikning 56-sahifasidagi teskarisini faraz qilib isbotlash usulini qo‘llash sxemasidan foydalanish	Teskarisini faraz qilib isbotlash usuli qanday qoidaga asoslangan?

	Perpendikulyar va og‘ma haqida	Darslikning 54-sahifasidagi geometrik tadqiqotni bajarish	1. Berilgan nuqtadan to‘g‘ri chiziqqa tushirilgan: a) perpendikulyar; b) og‘ma deb nimaga aytiladi? 2. 17-rasmga qarab qurilishda shoqul asbobining ishlatilishini izohlang. 3. Amaliy mashq va tatbiq (1, 2, 3, 4).
Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikning 58-sahifasidagi 5-, 6-, 7- savollarga javob berish
Uyga vazifa	1. Darslikdagi 8-, 9-savollarga javob berish. 2. Darslikdagi 5-, 6-, 7-amaliy mashqlarni yechish.		

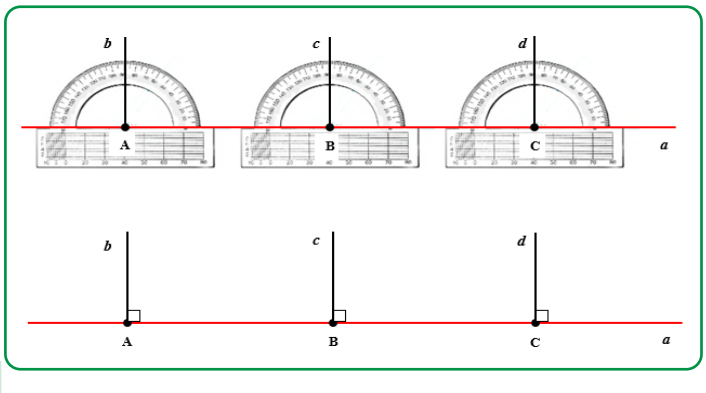
Masalalar, yechimlari va ularga doir ko‘rsatmalar

1. Chizg‘ich va go‘niya yordamida berilgan to‘g‘ri chiziqqa unda yotuvchi nuqtadan o‘tuvchi perpendikulyar to‘g‘ri chiziq yasang.



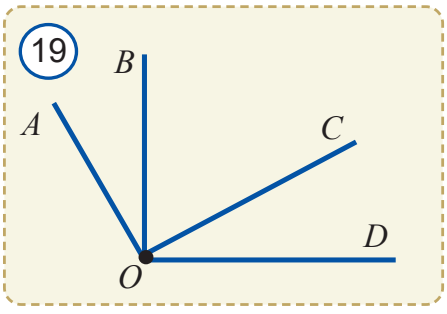
$a \in O;\ a \in B;\ b \in A;$
$a \cap b = O;\ \angle AOB = 90°.$
demak, $a \perp b$.

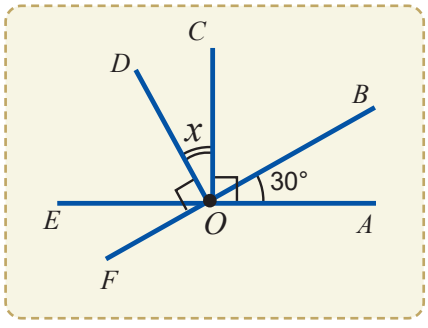
2. a to‘g‘ri chiziqda A, B, C nuqtalarni belgilang va transportir yordamida bu nuqtalarning har biri orqali a to‘g‘ri chiziqqa perpendikulyar bo‘lgan to‘g‘ri chiziqlarni o‘tkazing.



1) $a \in A;\ \ a \perp b.$
2) $a \in B;\ \ a \perp c.$
3) $a \in C;\ \ a \perp d.$
$b \parallel c,\ \ c \parallel d,\ \ b \parallel d.$

3. 18-rasmdagi noma'lum burchak x ni toping.





$\angle AOB = 30°;\ \angle AOC = 90°;\ \angle COE = 90°;\ \angle DOF = 90°;$
Topish kerak: $\angle COD = x$.
Vertikal burchaklar: $\angle AOB = \angle EOF = 30°$

$\angle DOE + \angle EOF = \angle DOF;\ \angle DOE + 30° = 90°;\ \angle DOE = 90° - 30° = 60°;$
$\angle COD + \angle DOE = \angle COE;\ x + 60° = 90°;\ x = 90° - 60° = 30°;$
$\angle AOB + \angle BOC = \angle AOC;\ 30° + \angle BOC = 90°;\ \angle BOC = 90° - 30° = 60°.$
Javob: $x = 30°$.

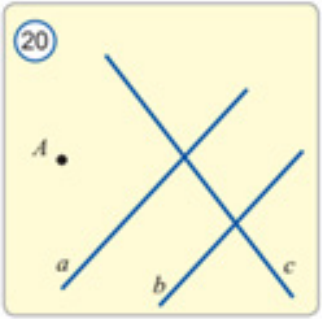
4. 19-rasmda agar $OB \perp OD$ va $OA \perp OC$ bo'lsa, $\angle AOB = \angle COD$ bo'lishini ko'rsating.

$OB \perp OD$ bo'lganligi uchun $\angle BOD = 90°;$
$OA \perp OC$ bo'lganligi uchun $\angle AOC = 90°;$

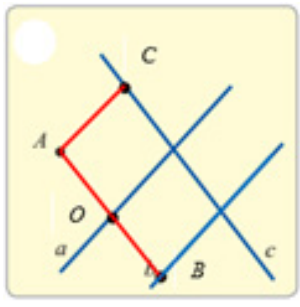
$$\begin{cases} \angle AOB = \angle AOC - \angle BOC \\ \angle COD = \angle BOD - \angle BOC \end{cases} \rightarrow \begin{cases} \angle AOB = 90° - \angle BOC \\ \angle COD = 90° - \angle BOC \end{cases}$$

$90° - \angle BOC = 90° - \angle BOC$ demak, $\angle AOB = \angle COD$.

5. Go'niya yordamida A nuqtadan a, b va c to'g'ri chiziqlargacha bo'lgan masofalarni toping *(20-rasm)*.

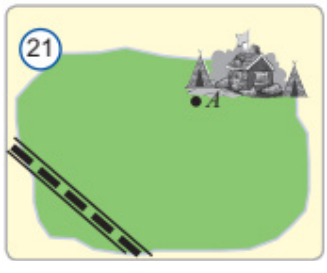


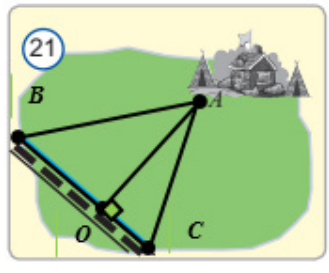
Go'niya yordamida A nuqtadan c to'g'ri chiziqqa parallel AB to'g'ri chiziq o'tkazamiz. Go'niyaning bir tomonini AB to'g'ri chiziqqa qo'yib, unga perpendikulyar AC to'g'ri chiziq chizamiz. Hosil bo'lgan AC to'g'ri chiziq a va b to'g'ri chiziqlarga parallel bo'ladi. Chizg'ich yordamida A nuqtadan a to'g'ri chiziqqacha bo'lgan masofa $1\ cm$, b to'g'ri chiziqqacha masofa $2\ cm$, c to'g'ri chiziqqacha masofa $1\ cm$ ekanligi kelib chiqadi.



Javob: $AO = 1\ cm,\ AB = 2\ cm,\ AC = 1\ cm.$

6. Transportir va oddiy chizg‘ich yordamida 21-rasmda tasvirlangan oromgohdan temiryo‘lgacha bo‘lgan eng qisqa masofani aniqlang. Masshtab (miqyos): 1 : 10000.





$AB = 2{,}51\ cm;\ AC = 2{,}06\ cm;$
$AO = 1{,}37\ cm.$
$AB = 2{,}51 \cdot 10000 = 25100\ km.$
$AC = 2{,}06 \cdot 10000 = 20600\ km$
$AO = 1{,}37 \cdot 10000 = 13700\ km.$

Oromgohdan temiryo‘lgacha bo‘lgan eng qisqa masofa $AO \perp BC$ bo‘lgan hol.
Javob: $AO = 13700\ km.$

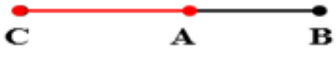
7. A, B, C nuqtalar bir to‘g‘ri chiziqda yotsa va: a) $AB = 3{,}6;\ \ BC = 5{,}4;\ AC = 9$; b) $AB = 2{,}4;\ BC = 4{,}2;\ AC = 1{,}8$ bo‘lsa, C nuqtaning A va B nuqtalar orasida yotmasligini isbotlang. Bu nuqtalardan qaysi biri qolgan ikkitasi orasida yotadi?

a)



$AB = 3{,}6;\quad BC = 5{,}4;\quad AC = 9$
$AB + BC = AC;\quad 3{,}6 + 5{,}4 = 9;\quad 9 = 9.$ C nuqta A va B nuqtalar orasida yotmaydi. Bu nuqtalardan B nuqta qolgan ikkitasi orasida yotadi.

b)



$AB = 2{,}4;\quad BC = 4{,}2;\quad AC = 1{,}8.$
$BC - AB = AC;\quad 4{,}2 - 2{,}4 = 1{,}8;\quad 1{,}8 = 1{,}8.$

C nuqta A va B nuqtalar orasida yotmaydi. Bu nuqtalardan A nuqta qolgan ikkitasi orasida yotadi.

2-DARS

I. Standartlar:

M7.GO‘.MM.01. Perpendikulyar va og‘mani tasavvur qila oladi va nuqtadan to‘g‘ri chiziqqacha bo‘lgan masofani topa oladi;

II. Dars maqsadi:

O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

— perpendikulyar to‘g‘ri chiziqlarni tasavvur qila olish;
— nuqtadan to‘g‘ri chiziqqacha bo‘lgan masofani topa olish.

Ko‘nikmalar:

— nuqtadan to‘g‘ri chiziqqacha bo‘lgan masofani topa oladi;

III. Dars mazmunining qisqacha tavsifi:

— nuqtadan to‘g‘ri chiziqqacha bo‘lgan masofa;
— to‘g‘ri chiziqqa perpendikulyar o‘tkazish algoritmi.

IV. Dars ashyolari va ko‘rgazmali qurollar:

— transportir, chizg‘ich;

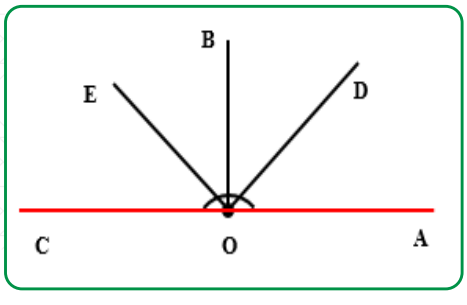
V. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	A nuqtadan a to‘g‘ri chiziqqacha bo‘lgan masofa deb nimaga aytiladi?	Anagramma usuli	To‘g‘ri chiziqda yotmagan nuqtadan shu to‘g‘ri chiziqqa bittadan ortiq perpendikulyar to‘g‘ri chiziq tushirish mumkinmi?
Bilimlarni boyitish va mustahkamlash	To‘g‘ri chiziqning O nuqtasiga perpendikulyar tushirishning amaliy yo‘riqlari	Darslikning 54-sahifasidagi 7-rasm bilan ishlash	Darslikning 54-sahifasidagi geometrik tadqiqotni bajaring

	Eker asbobidan qayerlarda va nima uchun foydalaniladi?	Darslikning 56-sahifasidagi 14-rasm bilan ishlash	1. Berilgan nuqtadan to‘g‘ri chiziqqa tushirilgan: a) perpendikulyar; b) og‘ma deb nimaga aytiladi? 2. 17-rasmga qarab qurilishda shoqul asbobining ishlatilishini izohlang. 3. Amaliy mashq va tatbiq (8, 9, 10, 11).
Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikning 58-sahifasidagi 5-, 6-savollarga javob berish
Uyga vazifa	1. Darslikdagi 10-savolga javob berish. 2. Darslikdagi 12-, 13-, 14-, 15-amaliy mashqlarni yechish.		

Masalalar, yechimlari va ularga doir ko‘rsatmalar

1*. Qo‘shni burchaklar bissektrisalari orasidagi burchakni toping.



$\angle AOB = 90°;\ \angle BOC = 90°.$

OD nur bissektrisa:

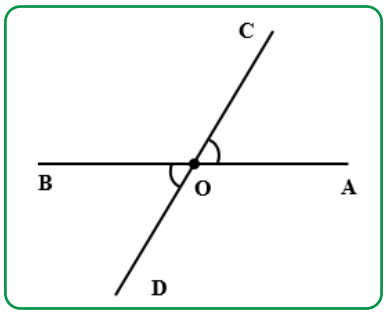
$$\angle BOD = \frac{\angle AOB}{2} = \frac{90°}{2} = 45°;$$

$$\angle BOE = \frac{\angle BOC}{2} = \frac{90°}{2} = 45°;$$

$\angle DOE = \angle BOD + BOE = 45° + 45° = 90°.$

Javob: $\angle DOE = 90°.$

2*. Vertikal burchaklar tengligini teskarisini faraz qilish usuli bilan isbotlang.



$\angle AOC$ va $\angle BOD$ vertikal burchaklar

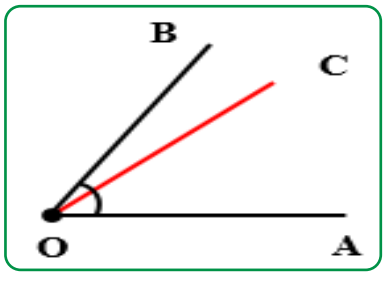
$$\begin{cases} \angle AOC \text{ va } \angle BOC \text{ qo‘shni} \\ \angle BOD \text{ va } \angle BOC \text{ qo‘shni} \end{cases} \rightarrow \begin{cases} \angle AOC + \angle BOC = 180°; \\ \angle BOD + \angle BOC = 180;° \end{cases}$$

$\angle AOC + \angle BOC - \angle BOD - \angle BOC = 180° - 180°$

$\angle AOC - \angle BOD = 0°;\qquad \angle AOC = \angle BOD.$

Demak, vertikal burchaklar teng ekan.

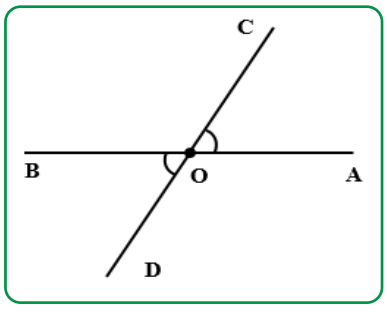
3*. Agar $\angle AOB = 58°$, $\angle BOC = 17°$ va $\angle AOC = 41°$ bo‘lsa, OA, OB va OC nurlardan qaysi biri qolgan ikkitasining orasida yotadi.



$\angle AOB = 58°$; $\angle BOC = 17°$;
$\angle AOC = 41°$.
$\angle AOC + \angle BOC = \angle AOB$;
$41° + 17° = 58°$; $58° = 58°$.

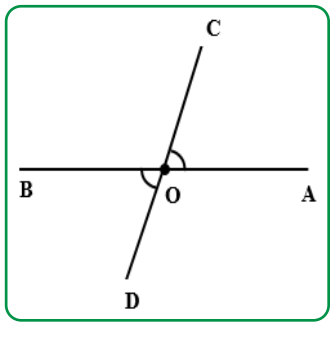
Javob: nurlardan OC qolgan ikkitasining orasida yotadi.

4. Ikki to‘g‘ri chiziqning kesishishidan hosil bo‘lgan burchaklardan ikkitasining yig‘indisi $120°$. Bu burchaklarni toping.



Vertikal burchaklar teng: $\angle AOC = \angle BOD$.
$\angle AOC + \angle BOD = 120°$; $\angle AOC + \angle AOC = 120°$;
$2 \cdot \angle AOC = 120°$; $\angle AOC = \frac{120°}{2} = 60°$;
$\angle AOC = \angle BOD = 60°$.
Javob: $\angle AOC = 60°$; $\angle BOD = 60°$.

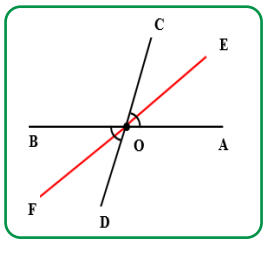
5. Ikki to‘g‘ri chiziqning kesishishidan hosil bo‘lgan burchaklardan ikkitasining ayirmasi $20°$. Bu burchaklarni toping.



$\angle BOC - \angle AOC = 20°$; $\angle BOC + \angle AOC = 180°$;
$\angle AOC + 20° + \angle AOC = 180°$; $2\angle AOC + 20° = 180°$;
$2\angle AOC = 180° - 20°$; $2\angle AOC = 160°$; $\angle AOC = 80°$;
$\angle BOC = 20° + \angle AOC = 20° + 80° = 100°$;
Vertikal burchaklar teng: $\angle AOC = \angle BOD = 80°$;
$BOC = \angle AOD = 100°$.

Javob: $80°, 100°, 80°, 100°$.

6*. Vertikal burchaklarning bissektrisalari bir to‘g‘ri chiziqda yotishini isbotlang.



$\angle AOC = \angle BOD$; $\angle AOC = \alpha$; $\angle COB = \beta$;

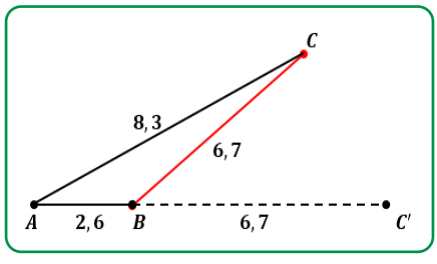
$\angle EOC = \frac{\angle AOC}{2} = \frac{\alpha}{2}$; $\angle BOF = \frac{\angle BOD}{2} = \frac{\alpha}{2}$;

$\angle AOC + \angle COB = \alpha + \beta = 180°$;

$$\angle EOC + \angle COB + \angle BOF = \frac{\alpha}{2} + \beta + \frac{\alpha}{2} = \alpha + \beta = 180°.$$

Demak, OE va OF bir to‘g‘ri chiziqda yotadi.

7*. Tekislikda uchta – A, B, C nuqta berilgan: $AB = 2{,}6$; $AC = 8{,}3$; $BC = 6{,}7$. Bu nuqtalarning bir to‘g‘ri chiziqda yotmasligini isbotlang.

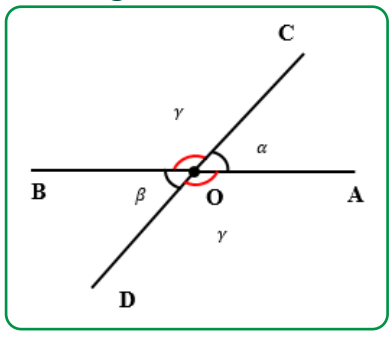


Ikkita – AB va BC kesmalar yig‘indisini qaraylik:

$AB + BC = 2{,}6 + 6{,}7 = 9{,}3;$

$9{,}3 > 8{,}3$; $AB + BC > AC$ bo‘lganligi uchun bir to‘g‘ri chiziqda yotmaydi.

8*. Ikki to‘g‘ri chiziqning kesishishidan hosil bo‘lgan burchaklardan ikkitasining yig‘indisi $180°$ ga teng emas. Bu burchaklarning vertikal burchaklar ekanini isbotlang.



Xossa. Vertikal burchaklar o‘zaro teng.

Aytaylik, $\angle\alpha$ va $\angle\beta$ vertikal burchaklar berilgan, $\angle\gamma$ – ularga qo‘shni burchak bo‘lsin. $\angle\alpha = \angle\beta$ bo‘lishini isbotlaymiz.

Isbot: $\angle\alpha + \angle\gamma = 180°$, chunki $\angle\alpha$ va $\angle\gamma$ qo‘shni burchaklardir.

$\angle\gamma + \angle\beta = 180°$, chunki $\angle\gamma$ va $\angle\beta$ lar ham qo‘shni burchaklardir. Bu ikki tenglikdan $\angle\alpha + \angle\gamma = \angle\gamma + \angle\beta$, ya’ni $\angle\alpha = \angle\beta$ ekanini hosil qilamiz.

Xossa isbotlandi.

AMALIY MASHQ VA TATBIQ. (2 soat)

I. Standartlar:

M7.GO‘.MM.23. Geometrik mushohada yuritish orqali amaliy masalalarni yecha oladi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– geometrik shakllarning xossalarini bilish.

Ko‘nikmalar:

– geometrik mushohada yuritish orqali amaliy masalalarni yecha oladi.

III. Dars mazmunining qisqacha tavsifi:

– geometrik shakllarning xossalari haqida geometrik va mantiqiy fikrlashni rivojlantirish.

IV. Dars ashyolari va ko‘rgazmali qurollar:

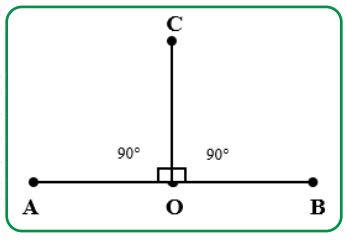
– transportir, chizg‘ich, qalam.

V. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Geometriya oid bilimlarni hayotda qayerlarda qo‘llash mumkin?	“Aqliy hujum”	Burchakning bissektrisasi qanday yasaladi?
Bilimlarni boyitish va mustahkamlash	Burchakka oid bilimlaringizni qayerda qo‘llash mumkin?	Hayotiy vaziyatlarga oid misollar keltirish	Tevarak-atrofdan turli burchaklarga oid misollar keltiring.
	O‘lchashga oid mashqlarni bajarish	Amaliy mashg‘ulot bajarish	Amaliy mashq va tatbiq (1, 2, 3, 4).
Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikning 64-sahifasidagi 5-, 6-, 7-amaliy mashqlarni bajarish
Uyga vazifa	Darslikdagi 8-, 11-amaliy mashqlarni yechish.		

Masalalar, yechimlari va ularga doir ko‘rsatmalar

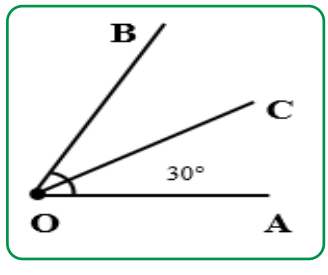
2. Yoyiq burchakning bissektrisasi uning tomonlari bilan qanday burchak hosil qiladi?



$\angle AOC = \angle BOC;\ \angle AOC + \angle BOC = \angle AOB;$
$\angle AOC + \angle AOC = 180°;\ 2\angle AOC = 180°;$
$\angle AOC = 90°;\ \angle BOC = 90°.$

Javob: Yoyiq burchakning bissektrisasi uning tomonlari bilan $90°$ li burchak hosil qiladi.

3. Burchakning bissektrisasi uning tomoni bilan 30° li burchak hosil qilgan bo‘lsa, burchakning o‘zi necha gradus?



OC – Burchakning bissektrisasi uning tomoni OA bilan hosil qilgan burchak $\angle AOC = 30°$ ga teng.

$\angle AOB = 2 \cdot \angle AOC = 2 \cdot 30° = 60°.$

Javob: $\angle AOB = 60°.$

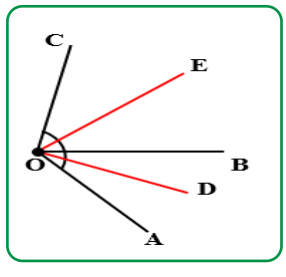
4. Burchakning bissektrisasi uning tomonlari bilan o‘tmas burchak tashkil qilishi mumkinmi?

1) Burchak $0° < \alpha < 90°$ bo‘lganda o‘tkir burchak, bu burchakka o‘tkazilgan bissektrisa, albatta, burchakni o‘tkir burchaklarga ajratadi.

2) $\alpha = 178°$ li o‘tmas burchakka bissektrisa o‘tkazsak, hosil bo‘lgan burchak $89°$ ga teng. Bu $0° < \alpha < 90°$ oraliqda. Demak, o‘tkir burchak hosil bo‘ladi.

Javob: yo‘q. Burchakning bissektrisasi uning tomonlari bilan o‘tmas burchak hosil qilmaydi.

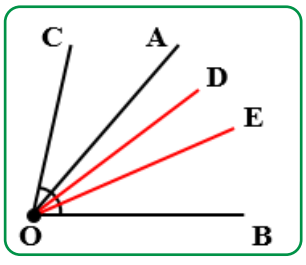
5. $\angle AOB = 50°$, $\angle BOC = 80°$ bo‘lsa, AOB va BOC burchaklarning bissektrisalari orasidagi burchakni toping. Masala nechta yechimga ega?



a) Berilgan: $\angle AOB = 50°,\ \angle BOC = 80°.$
Topish kerak: $\angle DOE = ?$

$$\angle DOE = \frac{\angle AOB}{2} + \frac{\angle BOC}{2} = \frac{50°}{2} + \frac{80°}{2} = 25° + 40° = 65°.$$

Javob: $\angle DOE = 65°.$



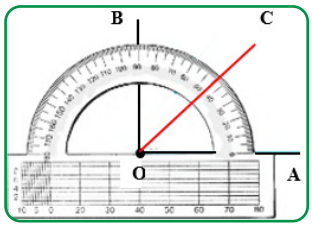
b) Berilgan: $\angle AOB = 50°,\ \angle BOC = 80°.$

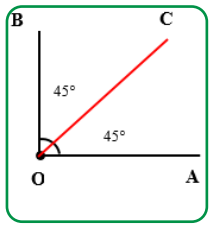
Topish kerak: $\angle DOE = ?$

$$\angle DOE = \frac{\angle BOC}{2} - \frac{\angle AOB}{2} = \frac{80°}{2} - \frac{50°}{2} = 40° - 25° = 15°.$$

Javob: $\angle DOE = 15°.$

7. a) 90°; b) 60°; c) 50°; d) 20° li burchakning bissektrisasini transportir yordamida yasang.

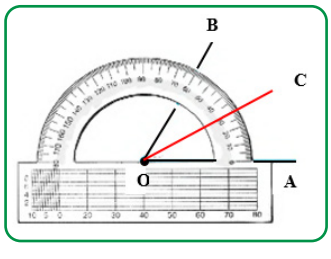


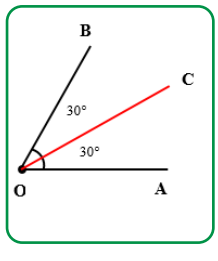


a) $\angle AOB = 90°.$

$$\angle AOC = \angle BOC = \frac{\angle AOB}{2} = \frac{90°}{2} = 45°$$

Javob: $\angle AOC = 45°;\ \angle BOC = 45°.$

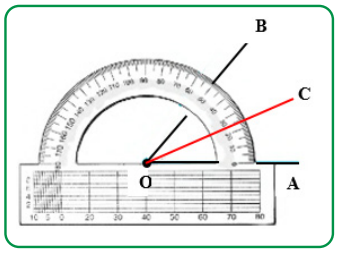


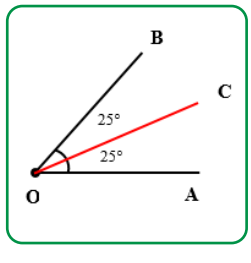


b) $\angle AOB = 60°.$

$$\angle AOC = \angle BOC = \frac{\angle AOB}{2} = \frac{60°}{2} = 30°$$

Javob: $\angle AOC = 30°;\ \angle BOC = 30°.$

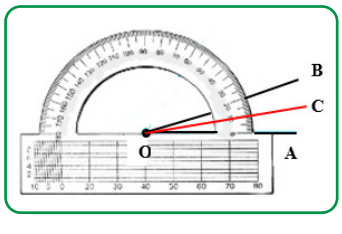


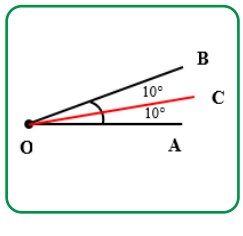


c) $\angle AOB = 50°.$

$$\angle AOC = \angle BOC = \frac{\angle AOB}{2} = \frac{50°}{2} = 25°$$

Javob: $\angle AOC = 25°;\ \angle BOC = 25°.$



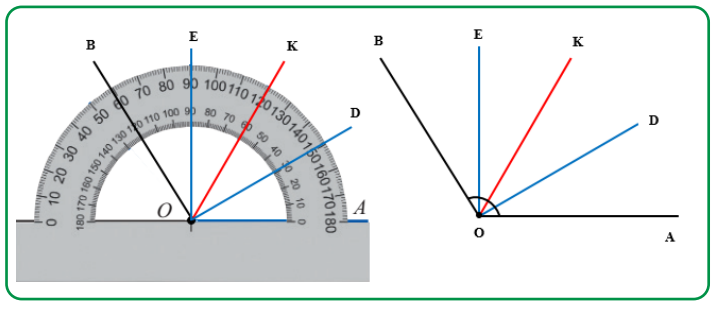


d) $\angle AOB = 20°.$

$$\angle AOC = \angle BOC = \frac{\angle AOB}{2} = \frac{20°}{2} = 10°$$

Javob: $\angle AOC = 10°;\ \angle BOC = 10°.$

6*. $\angle AOB = 120°$ **bo‘lgan burchakning** OK **bissektrisasini transportir yordamida yasang. So‘ngra hosil bo‘lgan** AOK **va** KOB **burchaklarning bissektrisalarini yasang va bu bissektrisalar orasidagi burchakni toping.**



Berilgan: $\angle AOB = 120°$.

$$\angle AOK = \frac{\angle AOB}{2} = \frac{120°}{2} = 60°;$$

$$\angle BOK = \frac{\angle AOB}{2} = \frac{120°}{2} = 60°;$$

$$\angle DOK = \angle AOD = \frac{\angle AOK}{2} = \frac{60°}{2} = 30°; \quad \angle BOE = \angle EOK = \frac{\angle BOK}{2} = \frac{60°}{2} = 30°;$$

$$\angle DOE = \angle DOK + \angle EOK = 30° + 30° = 60°.$$

Javob: $\angle DOE = 60°$.

7*. Agar $AB = 1{,}8\ m$, $AC = 1{,}3\ m$ **va** $BC = 3\ m$ **bo‘lsa,** A, B **va** C **nuqtalar bir to‘g‘ri chiziqda yotadimi?**

$AB + AC = 1{,}8\ m + 1{,}3\ m = 3{,}1$; $3{,}1 > 3$; $AB + AC > BC$ bo‘lgani uchun A, B va C nuqtalar bitta to‘g‘ri chiziqda yotmaydi. A, B va C nuqtalar bir to‘g‘ri chiziqda yotishi uchun $AB + AC = BC$ bo‘lishi kerak.

Javob: A,B va C nuqtalar bitta to‘g‘ri chiziqda yotmaydi.

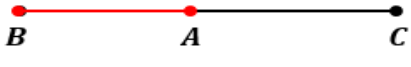
8. A, B **va** C **nuqtalar bir to‘g‘ri chiziqda yotadi. Agar** $AB = 2{,}7\ m$, $AC = 3{,}2\ m$ **bo‘lsa,** BC **kesmani uzunligini toping. Masala nechta yechimga ega?**

a)



$BC = AC - AB = 3{,}2\ m - 2{,}7\ m = 0{,}5\ m.$

b)



$BC = AC + AB = 3{,}2\ m + 2{,}7\ m = 5{,}9\ m.$

Javob: Ikkita yechimga ega: a) $BC = 0{,}5\ m$; b) $BC = 5{,}9\ m$.

9. Uzunligi $15\ m$ **bo‘lgan** AB **kesmada** C **nuqta belgilangan. Agar: a)** AC **kesma** BC **kesmadan** $3\ m$ **uzun; b)** C **nuqta** AB **kesmaning o‘rtasi bo‘lsa; c)** AC **va** BC **kesmalarning uzunliklari 2 : 3 nisbatda bo‘lsa,** AC **va** BC **kesmalar uzunliklarini toping.**

a)

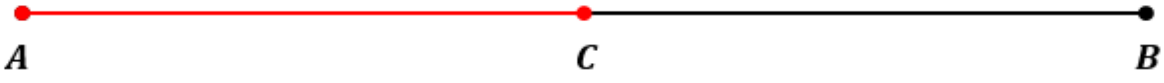


$\begin{cases} AC - BC = 3\ m \\ AC + BC = 15\ m \end{cases} \rightarrow AC - BC + AC + BC = 3\ m + 15\ m; \quad 2AC = 18\ m;$

$AC = 18\ m : 2; \quad AC = 9\ m; \quad BC = AC - 3\ m = 9\ m - 3\ m = 6\ m.$

Javob: $AC = 9\ m; \quad BC = 6\ m.$

b)

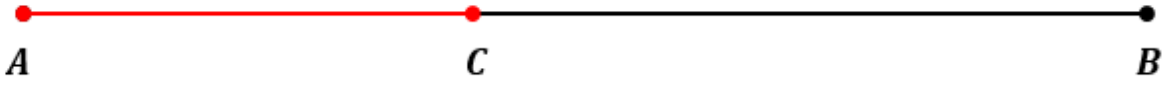


$AC = BC; \quad AC + BC = AB; \quad AC + AC = 15\ m; \quad 2AC = 15\ m;$

$AC = 15\ m : 2; \quad AC = 7{,}5\ m; \quad AC = BC = 7{,}5\ m.$

Javob: $AC = 7{,}5\ m; \quad BC = 7{,}5\ m.$

c)



$AC : BC = 2 : 3; \quad \begin{cases} AC = 2x \\ BC = 3x \end{cases} \rightarrow AC + BC = AB; \quad 2x + 3x = 15\ m;$

$5x = 15\ m; \quad x = \frac{15}{5}\ m; \quad x = 3\ m; \quad AC = 2x = 2 \cdot 3\ m = 6\ m;$

$BC = 3x = 3 \cdot 3\ m = 9\ m.$

Javob: $AC - 6\ m; \quad BC - 9m.$

2-DARS

I. Standartlar:

M7.GO‘.MM.23. Geometrik mushohada yuritish orqali amaliy masalalarni yecha oladi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– geometrik shakllarning xossalarini bilish;

Ko‘nikmalar:

– geometrik mushohada yuritish orqali amaliy masalalarni yecha oladi;

III. Dars mazmunining qisqacha tavsifi:

– geometrik shakllarning xossalari haqida geometrik va mantiqiy fikrni rivojlantirish.

IV. Dars ashyolari va ko‘rgazmali qurollar:

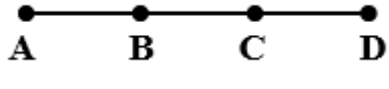
– transportir, chizg‘ich, qalam.

V. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Geometriyaga oid bilimlarni hayotda qayerlarda qo‘llash mumkin?	“Aqliy hujum”	Burchakning bissektrisasi qanday yasaladi?
Bilimlarni boyitish va mustahkamlash	Burchakka oid bilimlaringizni qayerda qo‘llash mumkin?	Hayotiy vaziyatlarga oid misollar keltirish	Tevarak-atrofdan turli burchaklarga oid misollar keltiring.
	O‘lchashga oid mashqlarni bajarish	Amaliy mashg‘ulot bajarish;	Amaliy mashq va tatbiq (12, 13, 14, 15)
Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikning 64-sahifasidagi 16-, 17-, 18-amaliy mashqlarni bajarish;
Uyga vazifa	Darslikdagi 19–21-amaliy mashqlarni yechish.		

Masalalar yechimlari va ularga doir ko‘rsatmalar

1. A, B, C, D nuqtalar bir to‘g‘ri chiziqda yotadi. Agar B nuqta AC kesmaning, C nuqta esa BD kesmaning o‘rtasi bo‘lsa, $AB = BC = CD$ ekanligini ko‘rsating.



$\begin{cases} AB = BC \\ BC = CD \end{cases} \rightarrow \quad AB = BC = CD\,.$

2. Hech bir uchtasi bir to‘g‘ri chiziqda yotmaydigan: a) 6; b) 7; c) 10; ta nuqtaning har ikkitasi orqali to‘g‘ri chiziq o‘tkazilgan. Jami nechta to‘g‘ri chiziq o‘tkazilgan?

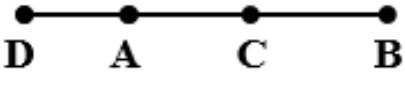
$\frac{n(n-1)}{3}$ dan foydalanish mumkin.

Javob: a) jami 15 ta to‘g‘ri chiziq o‘tkazilgan.

Javob: b) jami 21 ta to‘g‘ri chiziq o‘tkazilgan.

Javob: c) jami 45 ta to‘g‘ri chiziq o‘tkazilgan.

3. AB nurda C nuqta, BA nurda D nuqta shunday olinganki, $AC = 0,7$ va $BD = 2,1$. Agar $AB = 1,5$ bo‘lsa, CD ni toping.



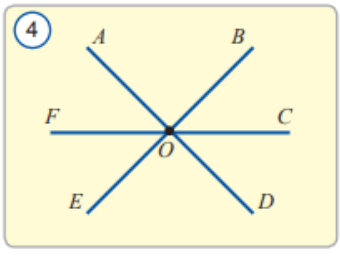
$AB = 1,5\,;$ $BD = 2,1\,;$ $AC = 0,7\,.$

$AC < AB$ bo‘lganligi uchun C nuqta AB nur orasida bo‘ladi. $BD > AB$ bo‘lgani uchun D nuqta BA nurning davomida bo‘ladi.

$AD = BD - AB = 2,1 - 1,6 = 0,5;$ $CD = AC + AD = 0,7 + 0,5 = 1,2.$

Javob: $CD = 1,2.$

4. Rasmda nechta vertikal burchaklar juftligi tasvirlangan?



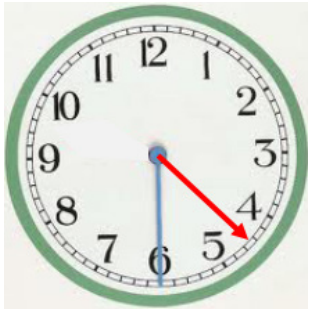
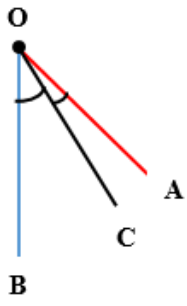
$\angle AOB = \angle EOD,$ $\angle BOC = \angle FOE,$

$\angle COD = \angle AOF,$ $\angle DOE = \angle BOA,$

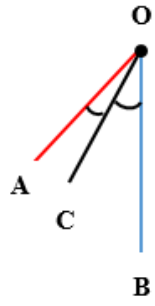
$\angle EOF = \angle COB,$ $\angle FOA = \angle DOC.$

Javob: 6 ta vertikal burchaklar juftligi tasvirlangan.

5*. Agar soatning soat va minut millari orasidagi burchak 45° bo‘lib, minut mili 6 da turgan bo‘lsa, soat qaysi vaqtni ko‘rsatayotgan bo‘ladi?

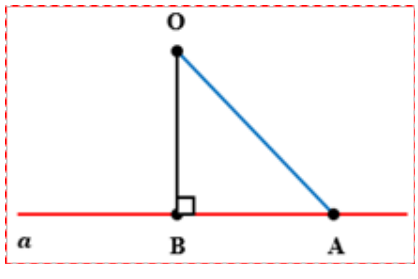



a) Soat 4^{30} da, $\angle AOB = 45°$.

b) Soat 7^{30} da, $\angle AOB = 45°$.

18. To‘g‘ri chiziqqa unda yotmagan O nuqtadan OA og‘ma va OB perpendikular o‘tkazilgan. Ularning uzunliklari yig‘indisi 13, ayirmasi esa 1 ga teng bo‘lsa, O nuqtadan to‘g‘ri chiziqqacha bo‘lgan masofani toping.



$$\begin{cases} OB + OA = 13 \\ OA - OB = 1 \end{cases} \rightarrow OB + OA + OA - OB = 14;$$

$$2OA = 14; \qquad OA = \frac{14}{2}; \qquad OA = 7;$$

$$OB = 13 - OA = 13 - 7 = 6.$$

Javob: $OB = 6$.

II BOB. UCHBURCHAKLAR

UCHBURCHAK, UNING TURLARI VA ELEMENTLARI (2 soat)

1-DARS

I. Standartlar:

M7.GO‘.GSH.09. Siniq chiziq, yopiq siniq chiziq, ko‘pburchak va ko‘pburchak elementlarini ta’riflaydi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– siniq chiziq, yopiq siniq chiziqni bilish;
– ko‘pburchak va ko‘pburchak elementlarini ta’riflay olish.

Ko‘nikmalar:

– siniq chiziqning elementlarini biladi, uzunligini hisoblaydi.

III. Dars mazmunining qisqacha tavsifi:

– siniq chiziq, uning elementlari, uzunligi;
– yopiq siniq chiziq va ko‘pburchaklar, ularning xossalari.

IV. Dars ashyolari va ko‘rgazmali qurollar:

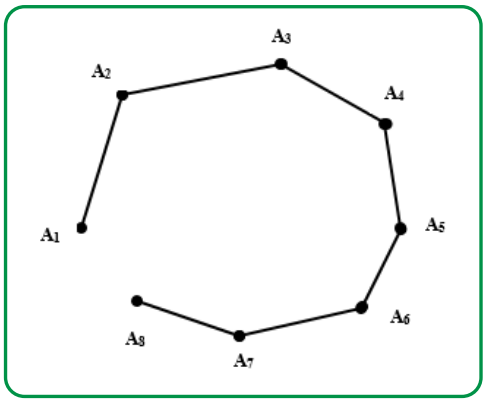
V. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Qanday shakl siniq chiziq deyiladi?	“Aqliy hujum”	To‘g‘ri chiziqda yotmagan nuqtadan shu to‘g‘ri chiziqqa bittadan ortiq perpendikulyar to‘g‘ri chiziq tushirish mumkinmi?
Bilimlarni boyitish va mustahkamlash	Yopiq siniq chiziq va ko‘pburchaklar	Darslikning 72-sahifasidagi 2-, 3-rasmlar bilan ishlash	1. Ko‘pburchak nima? Misollar keltiring. 2. Amaliy mashq va tatbiq (1, 3, 5).

	Ko‘pburchakning ichki va tashqi sohasi	Darslikdagi 4-rasm bilan ishlash	Ko‘pburchaklar nimasiga qarab nomlanadi?
Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	17-rasmda tasvirlangan shakllarning qaysilari: a) siniq chiziq; b) yopiq siniq chiziq; c) ko‘pburchak bo‘lishini aniqlang.
Uyga vazifa	1. Daftarga siniq chiziq turlarini tasvirlab kelish. 2. Darslikdagi 2-, 4-, 6-amaliy mashqlarni yechish.		

Masalalar, yechimlari va ularga doir ko‘rsatmalar

1. Yetti bo‘g‘inli siniq chiziq chizing. Uning uchlari va bo‘g‘inlarini yozing.



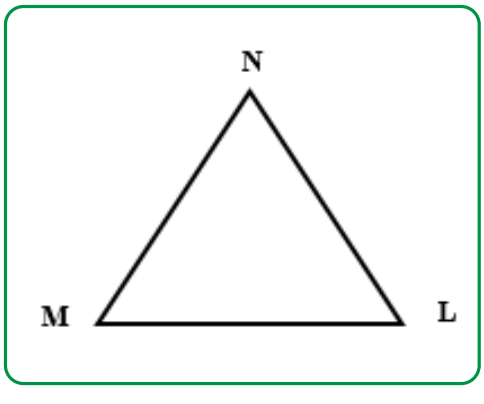
Siniq chiziq uchlari:

$A_1; A_2; A_3; A_4; A_5; A_6; A_7; A_8.$

Siniq chiziq bo‘g‘inlari:

$A_1A_2; A_2A_3; A_3A_4; A_4A_5; A_5A_6; A_6A_7; A_7A_8.$

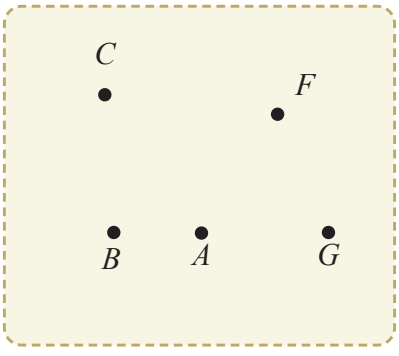
2. Uchburchakning uchlari M, N va L harflari bilan belgilandi. Uning tomonlari va burchaklarini yozing.



Uchburchakning tomonlari: $MN; NL; ML.$

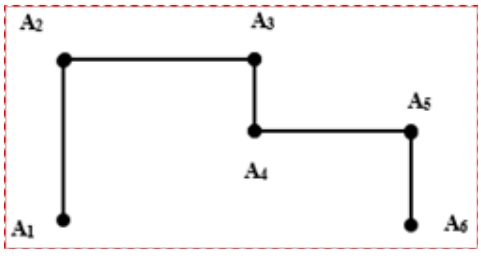
Uchburchakning burchaklari:

3. Rasmdagi a) C, F va A; b) A, B va G; c) F, B va G nuqtalar uchburchakning uchlari bo‘la oladimi? Nega?



Javob: a) ha; b) yo‘q; c) ha.

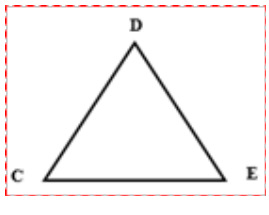
2. Har ikki qo‘shni bo‘g‘ini bir-biriga perpendikular bo‘lgan besh bo‘g‘inli siniq chiziq chizing. Bunday siniq chiziq yopiq bo‘lishi mumkinmi?



Har ikki qo‘shni bo‘g‘ini bir-biriga perpendikular bo‘lgan besh bo‘g‘inli siniq chiziq: A_1A_2; A_2A_3; A_3A_4; A_4A_5; A_5A_6.

Javob: Bunday siniq chiziq yopiq bo‘lishi mumkin emas.

4. CDE uchburchakning uchlari, burchaklari va tomonlarini yozing.



Uchburchakning uchlari: C; D; E.

Uchburchakning tomonlari: CD; DE; C.

Uchburchakning burchaklari: $\angle CDE$; $\angle DEC$; $\angle DCE$.

2-DARS

I. Standartlar:

M7.GO‘.GSH.10. Uchburchakni ta’riflay oladi, uning elementlarini, medianasi, bissektrisasi va balandligi tushunchalarini ta’riflab, chizmada tasvirlaydi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– uchburchakni ta’riflay olish;
– uning elementlarini ta’riflab, chizmada tasvirlay olish.

Ko‘nikmalar:

– teng yonli uchburchak bissektrisasi haqidagi teoremani biladi va qo‘llay oladi;
– uchburchakni tomonlari va burchaklariga ko‘ra turlarini aytib bera oladi.

III. Dars mazmunining qisqacha tavsifi:

– uchburchaklarning turlari; uchburchakning tomonlariga ko‘ra turlari;
– uchburchakning burchaklariga ko‘ra turlari.

IV. Dars ashyolari va ko‘rgazmali qurollar:

– chizg‘ich, qadimiy naqshlar, uchburchak modellari.

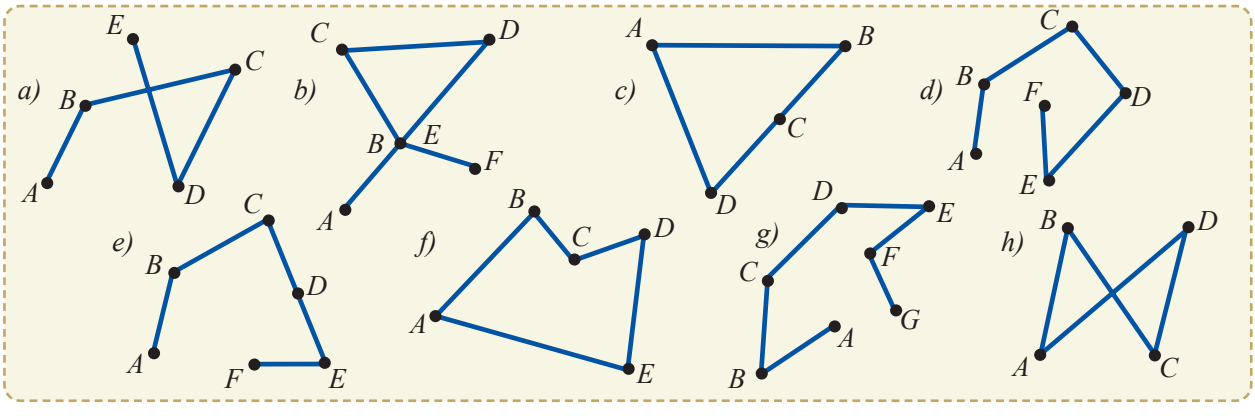
V. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Uchburchakning asosiy elementlari deb nimaga aytiladi?	Tarmoqlash usuli	Qanday shakl uchburchak deb ataladi? Uchburchakning uchi, tomoni va burchagi deb nimaga aytiladi?
Bilimlarni boyitish va mustahkamlash	Uchburchaklarning tomonlari uzunliklariga va burchaklariga ko‘ra turlari	Darslikning 74-sahifasidagi 6-, 7-rasmlar bilan ishlash	Amaliy mashq va tatbiq (7, 8).
	Bermuda uchburchagi	Darslikning 75-sahifasidagi ma’lumot va 14-rasm bilan ishlash;	Amaliy mashq va tatbiq (9, 10, 11).

Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikning 76-sahifasidagi 7-, 8- savollarga javob berish
Uyga vazifa	1. Darslikning 78-sahifasidagi tarixiy ma’lumotni o‘rganib kelish. 2. Darslikdagi 12-, 13-, 14-amaliy mashqlarni yechish.		

Masalalar, yechimlari va ularga doir ko‘rsatmalar

7*. Rasmda tasvirlangan shakllarning qaysilari: a) siniq chiziq; b) yopiq siniq chiziq; c) ko‘pburchak bo‘lishini aniqlang.



Javob: a) *a, b, d, e, g* rasmdagi shakllar siniq chiziq bo‘ladi;

b) *c, f, h* rasmdagi shakllar yopiq siniq chiziq bo‘ladi;

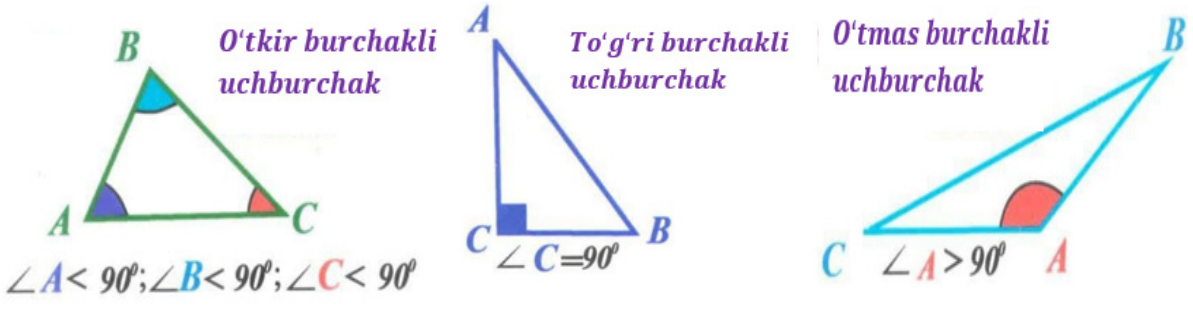
c) *c, f* rasmdagi shakllar ko‘pburchak bo‘ladi.

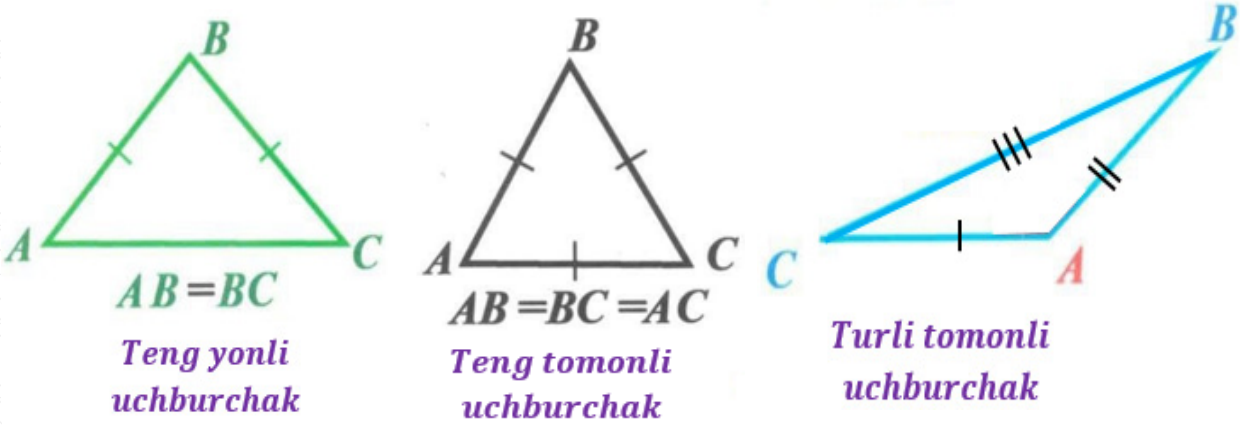
2. Uchburchakning qanday turlari bor? Har bir uchburchak turidan bitta uchburchak chizing. Ularni belgilang. Uchburchak turlarining ta’rifidan kelib chiqib, ularning o‘ziga xos xususiyatlari nimadan iborat ekanini ayting.

Uchburchakning turlari quyidagicha:

a) Burchaklariga ko‘ra: 1) o‘tkir burchakli uchburchak; 2) to‘g‘ri burchakli uchburchak; 3) o‘tmas burchakli uchburchak.

b) Tomonlariga ko‘ra: 1) teng yonli uchburchak; 3) teng tomonli uchburchak; 3) turli tomonli uchburchak.





Uchala burchagi ham o‘tkir bo‘lgan uchburchak *o‘tkir burchakli uchburchak* deyiladi.

Bitta burchagi to‘g‘ri bo‘lgan uchburchak *to‘g‘ri burchakli uchburchak* deyiladi.

Bitta burchagi o‘tmas bo‘lgan uchburchak *o‘tmas burchakli uchburchak* deyiladi.

Ikkita yon tomoni teng bo‘lgan uchburchak *teng yonli uchburchak* deyiladi.

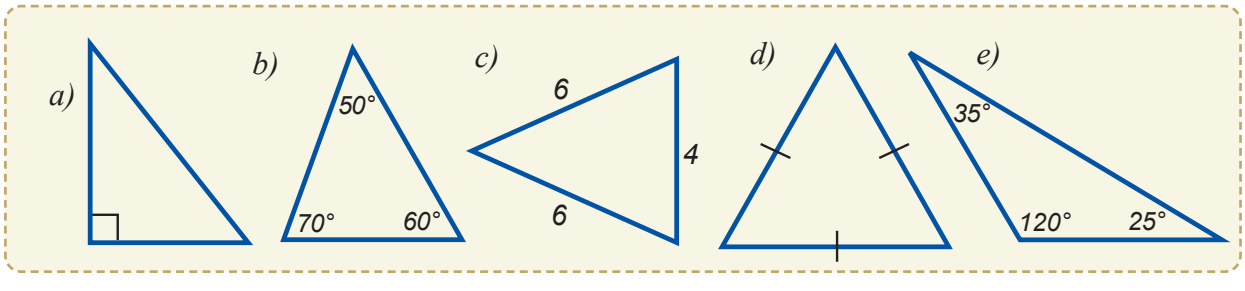
Uchala tomoni teng bo‘lgan uchburchak *teng tomonli uchburchak* deyiladi.

Uchala tomoni turli xil bo‘lgan uchburchak *turli tomonli uchburchak* deyiladi.

Uchburchaklar burchaklariga ko‘ra: *o‘tkir burchakli , to‘g‘ri burchakli va o‘tmas burchakli* turlarga ajratiladi.

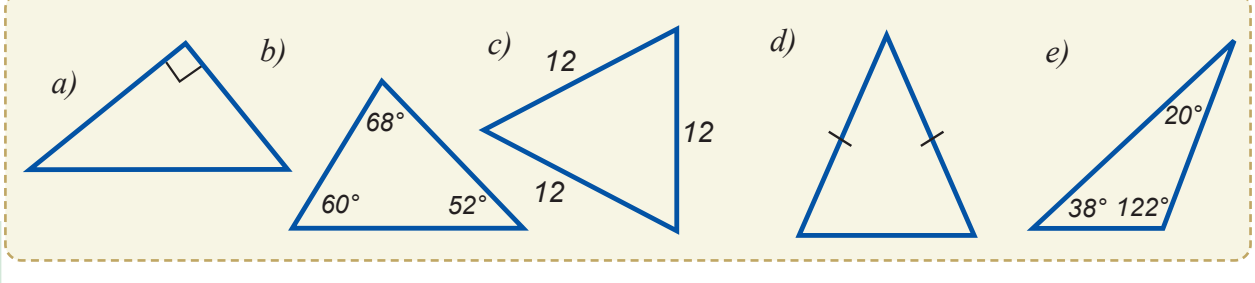
Uchburchaklar tomonlari uzunliklariga qarab: *teng tomonli, teng yonli* va *turli tomonli* turlarga ajratiladi.

3. Rasmdagi uchburchaklarning turlarini aniqlang.



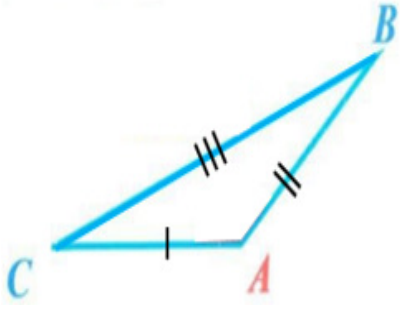
a) to‘g‘ri burchakli uchburchak; b) o‘tkir burchakli uchburchak; c) teng yonli uchburchak, d) teng tomonli uchburchak; e) o‘tmas burchakli uchburchak.

4. Rasmdagi uchburchaklarning turlarini aniqlang.



a) to‘g‘ri burchakli uchburchak; b) o‘tkir burchakli uchburchak; c) teng tomonli uchburchak, d) teng yonli uchburchak; e) o‘tmas burchakli uchburchak.

5. Tomonlari: a) 2,3 *dm*; 4,6 *dm* va 5,3 *dm*; b) 32,3 *m*; 54,8 *m* va 15,3 *m* bo‘lgan uchburchakning perimetrini hisoblang.



a) Berilgan: $AB = 4{,}6\ dm;\ BC = 5{,}3\ dm;$ $AC = 2{,}3\ dm$. Topish kerak: $P_{ABC} = ?$

$P_{ABC} = AB + BC + AC = 4{,}6\ dm + 5{,}3\ dm + 2{,}3\ dm =$
$= 12{,}2\ dm.$

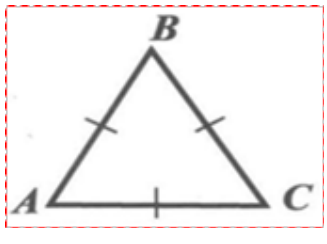
Javob: $P_{ABC} = 12{,}2\ dm.$

b) Berilgan: $AB = 32{,}3\ m;\ BC = 54{,}8\ m;\ AC = 15{,}3\ m.$ Topish kerak: $P_{ABC} = ?$

$P_{ABC} = AB + BC + AC = 32{,}3\ m + 54{,}8\ m + 15{,}3\ m = 102{,}4\ m.$

Javob: $P_{ABC} = 102{,}4\ m.$

14. Teng tomonli uchburchak chizib, burchaklarini o‘lchang va xulosa chiqaring.



$AB = BC = AC.\quad \angle A = 60°;\ \angle B = 60°;\quad \angle C = 60°;$

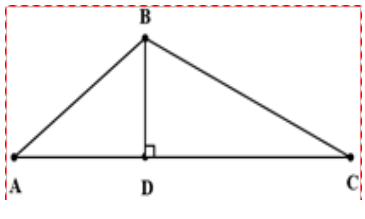
$\angle A + \angle B + \angle C = 60° + 60° + 60° = 180°;$

$\angle A + \angle B + \angle C = 180°.$

Xulosa: Uchburchakning tomonlari teng bo‘lganda, uning ichki burchaklari ham teng bo‘lib, har bir burchagi 60° dan iborat bo‘ladi.

23. Perimetri 36 ga teng bo‘lgan uchburchakning balandligi uni perimetrlari 18 va 24 ga teng bo‘lgan uchburchaklarga ajratadi. Berilgan uchburchakning balandligini toping.

Yechilishi:



1-usul. $P_{ABC} = 36;\quad P_{ABD} = 18;\quad P_{BDC} = 24.\quad BD = ?$

$$BD = \frac{(P_{ADC} + P_{BDC}) - P_{ABC}}{2} = \frac{(18 + 24) - 36)}{2} = \frac{42 - 36}{2} = \frac{6}{2} = 3.$$

Javob: $BD = 3.$

UCHBURCHAKLAR TENGLIGINING BIRINCHI ALOMATI (2 soat)

1-DARS

I. Standartlar:

M7.GO‘.MM.05. Uchburchaklar tengligining birinchi alomatini tushunadi, alomatga ko‘ra teng uchburchaklarni aniqlay oladi va masalalar yechishda qo‘llay oladi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– uchburchaklar tengligining birinchi alomatini tushunish;
– alomatga ko‘ra teng uchburchaklarni aniqlay olish.

Ko‘nikmalar:

– alomatga ko‘ra teng uchburchaklarni aniqlay oladi va masalalar yechishda qo‘llay oladi.

III. Dars mazmunining qisqacha tavsifi:

– uchburchaklar tengligi.
– uchburchaklar tengligining TBT (tomon – burchak – tomon) alomati haqidagi teorema.

IV. Dars ashyolari va ko‘rgazmali qurollar:

– chizg‘ich, qadimiy naqshlar, uchburchak modellari.

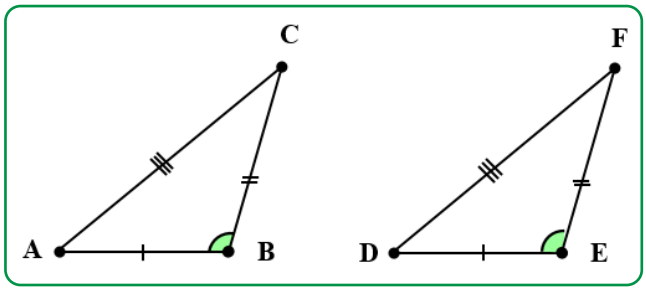
V. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlari	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Geometrik shakllarning tengligini qanday bilsa bo‘ladi?	“Aqliy hujum”	Qanday uchburchaklar teng deyiladi?
Bilimlarni boyitish va mustahkamlash	Uchburchaklar tengligining TBT alomati	Darslikning 80-sahifasidagi teorema bilan ishlash	Amaliy mashq va tatbiq (1, 2, 3, 4, 5).
Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Geometriyada “alomat” deganda nimani tushunasiz?
Uyga vazifa	1. Uchburchaklar tengligining TBT alomatini yodlash. 2. Darslikdagi 6-, 7-, 8-amaliy mashqlarni yechish.		

www.idum.uz saytidan yuklab olindi

Masalalar, yechimlari va ularga doir ko‘rsatmalar

1. $\triangle ABC = \triangle DEF$. Bu uchburchaklarning mos uchlari, tomonlari va burchaklarini aniqlab yozing.



1) ABC uchburchakning A uchiga DEF uchburchakning D uchi mos;

ABC uchburchakning B uchiga DEF uchburchakning E uchi mos;

ABC uchburchakning C uchiga DEF uchburchakning F uchi mos.

2) ABC uchburchakning AB tomoniga DEF uchburchakning DE tomoni mos;

ABC uchburchakning AC tomoniga DEF uchburchakning DF tomoni mos;

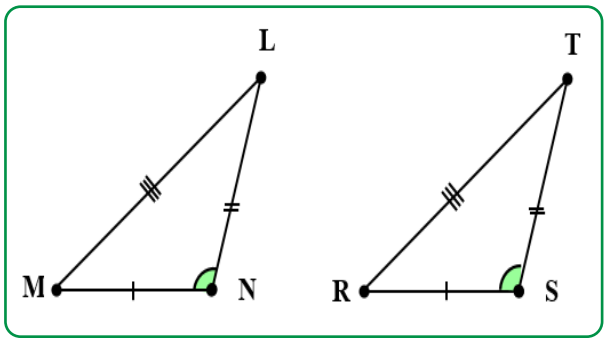
ABC uchburchakning BC tomoniga DEF uchburchakning EF tomoni mos.

3) ABC uchburchakning A burchagiga DEF uchburchakning D burchagi mos;

ABC uchburchakning B burchagiga DEF uchburchakning E burchagi mos;

ABC uchburchakning C burchagiga DEF uchburchakning F burchagi mos.

2. MNL va RST uchburchaklar teng. Bu uchburchaklarning mos uchlari, tomonlari va burchaklarini aniqlab yozing.



1) MNL uchburchakning M uchiga RST uchburchakning R uchi mos;

MNL uchburchakning N uchiga RST uchburchakning S uchi mos;

MNL uchburchakning L uchiga RST uchburchakning T uchi mos.

2) MNL uchburchakning MN tomoniga RST uchburchakning RS tomoni mos;

MNL uchburchakning ML tomoniga RST uchburchakning RT tomoni mos;

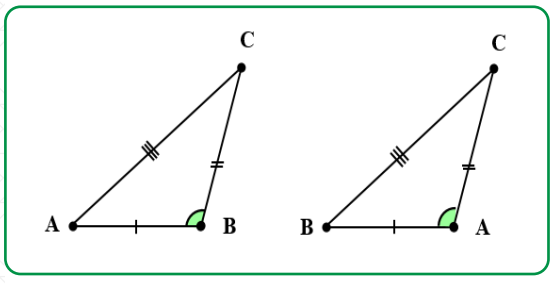
MNL uchburchakning NL tomoniga RST uchburchakning ST tomoni mos.

3) MNL uchburchakning M burchagiga RST uchburchakning R burchagi mos;

MNL uchburchakning N burchagiga RST uchburchakning S burchagi mos;

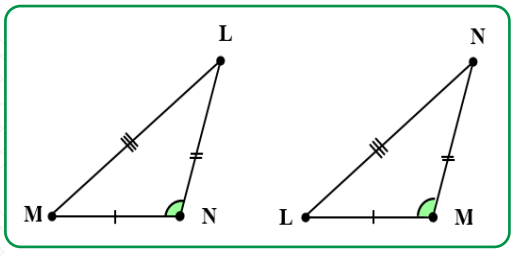
MNL uchburchakning L burchagiga RST uchburchakning T burchagi mos.

3. Agar $\Delta ABC = \Delta BAC$ ekanligi ma'lum bo'lsa, ABC uchburchakning qaysi tomonlari teng bo'ladi?



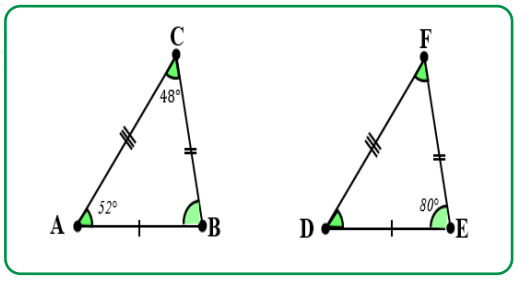
$\Delta ABC = \Delta BAC;\quad \angle ABC = \angle BAC;$
$\angle ACB = \angle BCA;\quad \angle BAC = \angle ABC;$
$AB = BA;\quad BC = AC;\quad AC = BC.$

4. ΔMNL - ΔLMN. MNL uchburchakning qaysi burchaklari teng bo'ladi?



$\Delta MNL = \Delta LMN;\ MN = LM;\ NL = MN;$
$ML = LN.\qquad \angle MNL = \angle LMN;$
$\angle MLN = \angle LNM;\quad \angle NML = \angle MLN.$

5. $\Delta ABC = \Delta DEF$. Agar $\angle A$ = 52°, $\angle E$ = 80° va $\angle C$ = 48° bo'lsa, bu uchburchaklarning qolgan burchaklarini toping.



$\angle B = 180° - (\angle A + \angle C) = 180° - (52° + 48°) =$
$= 180° - 100° = 80°;\quad \angle B = \angle E = 80°;$
$\angle A = \angle D = 52°;\quad \angle C = \angle F = 48°.$
Javob: $\angle B = 80°;\quad \angle D = 52°;\quad \angle F = 48°.$

2-DARS

I. Standartlar:

M7.GO‘.MM.05. Uchburchaklar tengligining birinchi alomatini tushunadi, alomatga ko‘ra teng uchburchaklarni aniqlay oladi va masalalar yechishda qo‘llay oladi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– uchburchaklar tengligining birinchi alomatini tushunish;
– alomatga ko‘ra teng uchburchaklarni aniqlay olish.

Ko‘nikmalar:

– alomatga ko‘ra teng uchburchaklarni aniqlay oladi va masalalar yechishda qo‘llay oladi;

III. Dars mazmunining qisqacha tavsifi:

– uchburchaklar tengligi;
– uchburchaklar tengligining TBT (tomon–burchak–tomon) alomati haqidagi teorema.

IV. Dars ashyolari va ko‘rgazmali qurollar:

– chizg‘ich, qadimiy naqshlar, uchburchak modellari.

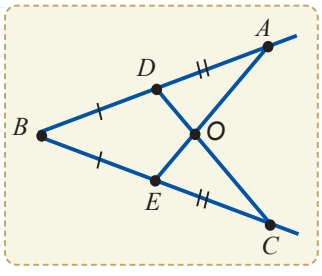
V. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Uchburchaklar tengligining TBT alomati	“Aqliy hujum”	Uchburchaklar tengligining TBT alomatini izohlang.
Bilimlarni boyitish va mustahkamlash	Teorema isboti	Darslikning 80-sahifasidagi 2-rasm bilan ishlash	Mavzu bo‘yicha savollar: Amaliy mashq va tatbiq (9, 10, 11).
Darsga yakun yasash	Bugun nimani o‘rgandik?	Amaliy mashqlar bajarish	Darslikdagi 12-, 13-, 14-mashqlarni bajarish

Uyga vazifa	1. Uchburchaklar tengligining TBT alomatini isbotlash. 2. Darslikdagi 15-, 16-, 17-amaliy mashqlarni yechish.

Masalalar, yechimlari va ularga doir ko‘rsatmalar

1. 6-rasmda $\angle BAE = \angle BCD$ ekanligini isbotlang.



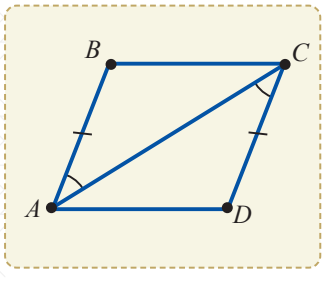
$BD = BE;\quad AD = CE;\quad OD = OE;\quad AO = OC;$

$\angle AOD = \angle COE;\ \angle ADO = \angle CEO;\quad \angle AOC = \angle DOE;$

$\angle DAE = \angle ECD;\ \angle DAE = \angle BAE;\quad \angle ECD = \angle BCD;$

$\angle BAE = \angle BCD.$

2. 7-rasmda $\Delta ABC = \Delta CDA$ ekanligini isbotlang.

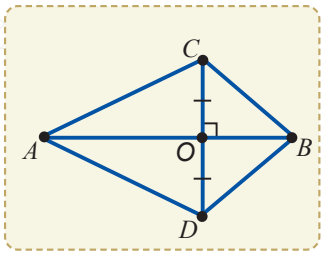


$AB = CD;\quad \angle BAC = \angle DCA;\quad AC$ - umumiy tomon,

$AD = BC;\quad \angle ACB = \angle CAD;\quad \angle ABC = \angle CDA.$

Bundan $\Delta ABC = \Delta CDA.$

3. 8-rasmda $\Delta ABC = \Delta ABD$ bo‘lishini isbotlang.

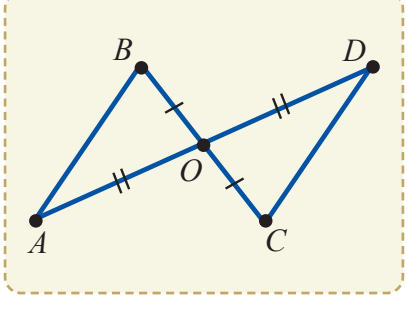


$OC = OD;\quad \angle COB = \angle DOB = 90°;\quad OB$-umumiy tomon; $BC = BD;$

$\angle AOC = \angle AOD = 90°;\quad AO$ -umumiy tomon;

$AC = AD;\quad \angle ACB = \angle ADB;\quad \angle ABC = \angle ABD.$ Bundan, $\Delta ABC = \Delta ABD$ ekanligi kelib chiqadi.

4. AD va BC kesmalar O nuqtada kesishadi va bu nuqtada teng ikkiga bo‘linadi. a) $\Delta AOB = \Delta DOC$; b) $BD = AC$; d) $\Delta ABD = \Delta DCA$ e) $\angle OAB = 35°$, $\angle OBA = 62°$ bo‘lsa, $\angle ODC$ va $\angle DCO$ ni toping.



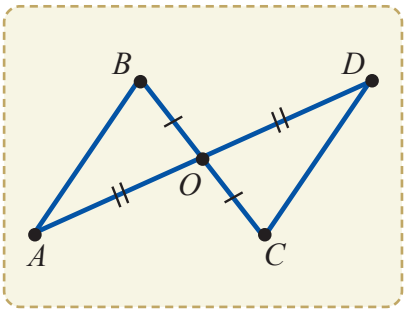
a) Berilgan: $\Delta AOB = \Delta DOC.$

Topish kerak: $\angle ODC = ?;\ \angle DCO = ?$

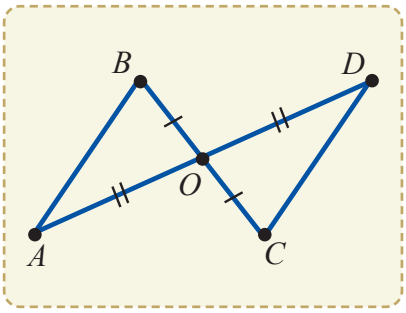
$AO = OD;\ BO = OC;\ \angle AOB = \angle DOC;\ AB = CD;$

$\angle ABO = \angle DCO.$

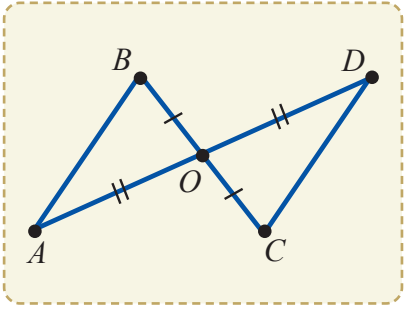
Javob: $\angle ADC = \angle ODC.\ \angle ABO = \angle ODC;\ \angle DCB = \angle DCO.$



b) Berilgan: $BD = AC$.
Topish kerak: $\angle ODC = ?, \angle DCO = ?$
$AO = OD;\ BO = OC;\ \angle AOB = \angle DOC;\ AB=CD;$
$\angle ABO = \angle DCO;\ \angle BAO = \angle CDO.$
Javob: $\angle ADC = \angle ODC;\ \angle DCB = \angle DCO.$

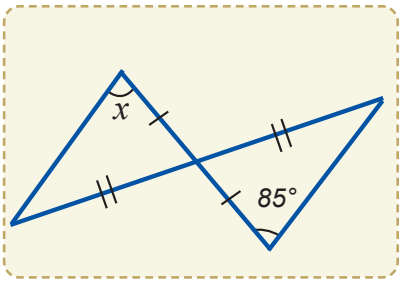


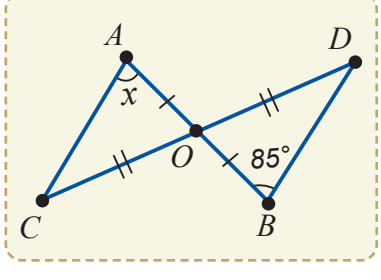
d) Berilgan: $\Delta ABD = \Delta DCA$.
Topish kerak: $\angle ODC = ?, \angle DCO = ?$
$AO = OD;\ BO = OC;\ \angle AOB = \angle DOC;\ AB = CD;$
$\angle ABO = \angle DCO;\ \angle AOC = \angle DOB;\ BD = AC.$
Javob: $\angle ADC = \angle ODC;\ \angle DCB = \angle DCO.$



e) Berilgan: $\angle OAB=35°;\ \angle OBA = 62°.$
Topish kerak: $\angle ODC=?, \angle DCO = ?$
$\angle AOB = 180°-(\angle OAB + \angle OBA) = 180° - (35° + 62°)$
$= 180° - 97° = 83°;$
$\angle AOB = \angle DOC = 83°;\ AB = CD;\ \angle OAB = \angle ODC;$
$\angle OBA = \angle DCO;\ \angle OAB = \angle ODC = 35°;$
$\angle OBA = \angle DCO = 62°.$
Javob: $\angle ODC = 35°;\ \angle DCO = 62°.$

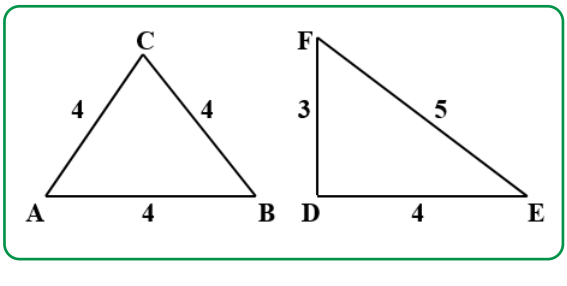
5. Rasmdagi noma'lum burchak x ni toping.





$AO = OB;\ CO = OD;$
$AC = BD;$
$\angle AOC = \angle BOD;$
$\angle ACO = \angle BDO;$
$x = \angle OAC = \angle OBD = 85°.$
Javob: $x = 85°.$

6. Bir uchburchak perimetri ikkinchi uchburchak perimetriga teng. Bu uchburchaklar teng bo'ladimi?



$P_{ABC} = P_{DEF};$
$P_{ABC} = AB + BC + AC = 4 + 4 + 4 = 12;$
$P_{DEF} = DE + EF + DF = 4 + 5 + 3 = 12;$
Uchburchaklar burchaklari teng emas.
Javob: bu ABC va DEF uchburchaklar teng bo'lmaydi.

TENG YONLI UCHBURCHAKNING XOSSALARI (2 soat)

1-DARS

I. Standartlar:

M7.GO‘.MM.06. Teng yonli uchburchak, uning elementlarini biladi, xossalarini masalalar yechishda qo‘llay oladi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– teng yonli uchburchak, uning elementlarini bilish;
– xossalarini masalalar yechishda qo‘llay olish.

Ko‘nikmalar:

– teng yonli uchburchak, uning elementlarini biladi;
– xossalarini masalalar yechishda qo‘llay oladi

III. Dars mazmunining qisqacha tavsifi:

– teng yonli uchburchak va uning elementlari;
– teng yonli uchburchakning xossalari.

IV. Dars ashyolari va ko‘rgazmali qurollar:

– chizg‘ich, uchburchak modellari.

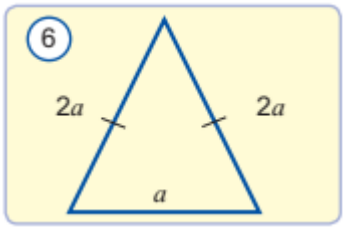
V. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Qanday uchburchakni teng yonli uchburchak deb atash mumkin?	“Aqliy hujum”	Teng yonli uchburchak ta’rifi va xossalarini ayting.
Bilimlarni boyitish va mustahkamlash	Teng yonli uchburchakni tasvirlash	Darslikning 82-sahifasidagi geometrik tadqiqot bilan ishlash	Amaliy mashq va tatbiq (1, 2)
	Teng yonli uchburchakning asosidagi burchaklari haqidagi teorema	Darslikning 82-sahifasidagi teorema va 3-rasm bilan ishlash	Amaliy mashq va tatbiq (3, 4, 5)

Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikdagi 6-, 7-amaliy mashqlarni bajarish
Uyga vazifa	1. Daftarga o‘tkir burchakli va o‘tmas burchakli teng yonli uchburchaklar chizib kelish. 2. Darslikdagi 8-, 9-amaliy mashqlarni yechish.		

Masalalar, yechimlari va ularga doir ko‘rsatmalar

1. Rasmda $P = 50\ cm$ bo‘lsa, a = ?

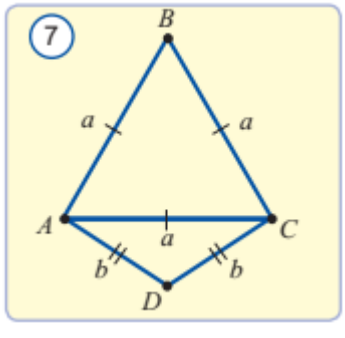


$a + 2a + 2a = P$; $\quad 5a = 50\ cm$; $\quad a = \frac{50}{5}\ cm$;

$a = 10\ cm.$

Javob: $a = 10\ cm.$

2. Rasmda $P_{ABC} = 36$ va $P_{ADC} = 28$ bo‘lsa, a = ?, b =?



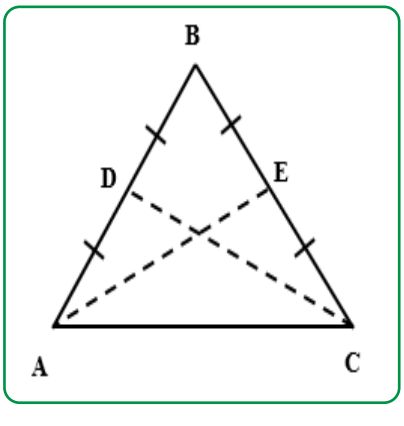
$a + a + a = P_{ABC}$; $\quad 3a = 36$; $\quad a = \frac{36}{3}$; $\quad a = 12$;

$a + b + b = P_{ADC}$; $\quad 12 + 2b = 28$; $\quad 2b = 28 - 12$;

$2b = 16$; $\quad b = \frac{16}{2}$; $\quad b = 8$.

Javob: $a = 12;\ b = 8.$

3. Teng yonli uchburchakning yon tomonlariga tushirilgan medianalari teng bo‘lishini isbotlang.



$AB = BC = b$; $\quad AD = DB = \frac{b}{2}$; $\quad BE = EC = \frac{b}{2}$;

AE va CD lar mediana $AB = BC \rightarrow \angle A = \angle C = \alpha$ ekanligi kelib chiqadi.

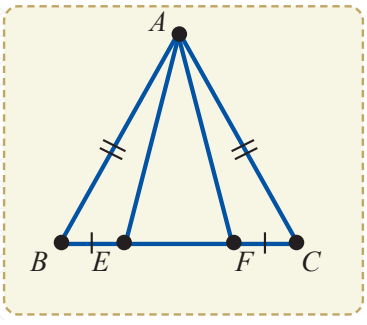
$\Delta ADC \rightarrow \quad AD = \frac{b}{2}$; $\quad AC = a$; $\quad \angle A = \alpha$.

$\Delta AEC \rightarrow \quad CE = \frac{b}{2}$; $\quad CA = a$; $\angle C = \alpha$.

TBT alomatiga ko‘ra, $\Delta ADC = \Delta AEC$ bo‘ladi. Demak, AE va CD mos tomonlari ham teng bo‘ladi.

$AE = CD$. Isbot bo‘ldi.

4. Rasmda $AB = AC$, $BE = FC$. a) $\Delta ABE = \Delta ACF$; b) $AE = AF$; c) $\Delta ABF = \Delta ACE$ ekanligini isbotlang.



a) $AB = AC$; $BE = FC$; $\angle B = \angle C$.

TBT alomatiga ko'ra $\Delta ABE = \Delta ACF$ bo'ladi.

b) $AB = AC$; $BE = FC$; $\Delta ABE = \Delta ACF$ da

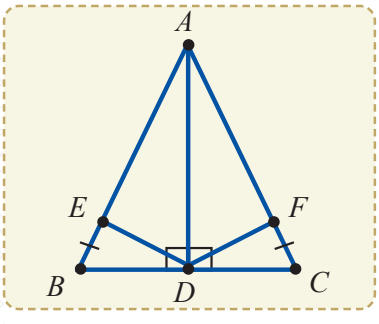
AE va AF lar mos tomonlari teng. $AE = AF$.

c) $AB = AC$; $BE = FC$; ΔABF va ΔAEC da

$$AB = AC; \quad \begin{cases} BF = BE + EF \\ EC = FC + EF \end{cases} \rightarrow \quad BF = EC; \qquad AE = AF.$$

TTT alomatiga ko'ra, $\Delta ABF = \Delta AEC$ bo'ladi. Isbot bo'ldi.

5. Rasmda $AB = AC$, $BE = CF$. a) $\Delta AED = \Delta AFD$; b) $\Delta BED = \Delta CFD$ tenglikarni isbotlang.



a) $AB = AC = b$; $BE = CF = x$;

$\angle BAD = \angle CAD = \alpha$; $AE = AF = AB\text{-}BE = b - x$;

AD-tomon ΔAED va ΔAFD lar uchun umumiy

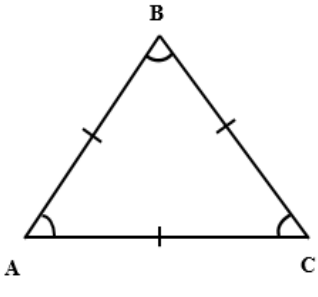
$$\begin{cases} EA = FA \\ \angle EAD = \angle FAD \rightarrow \text{TBT ga ko'ra } \Delta AED = \Delta AF \\ AD \text{ umumiy} \end{cases}$$

b) $AB = AC = b$; $BE = CF = x$; $\angle DBE = \angle DCF = \alpha$;

$BD = DC$ ΔAED va ΔAFD lar uchun umumiy

$$\begin{cases} EB = FC \\ \angle EBD = \angle FCD \rightarrow \text{TBT ga ko'ra, } \Delta BED = \Delta CFD \\ BD = DC \end{cases}$$

6. Teng tomonli uchburchakning barcha burchaklari teng ekanini isbotlang.



Teng yonli uchburchakning asosidagi burchaklari teng.

$AB = BC$; $\angle A = \angle C$; $AB = AC$; $\angle B = \angle C$

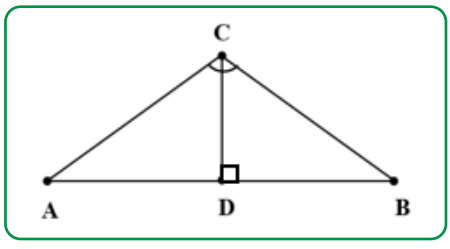
demak, $\angle A = \angle B = \angle C$. Isbot bo'ldi.

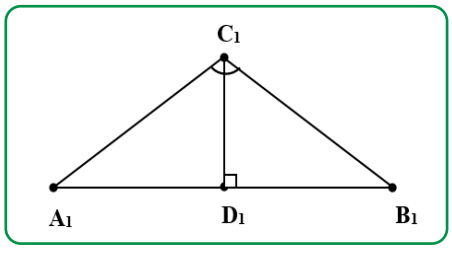
$\angle A + \angle B + \angle C = 180°$; $\angle A + \angle A + \angle A = 180$

$3 \cdot \angle A = 180°$; $\angle A = 60°$.

Javob: $\angle A = \angle B = \angle C = 60°$.

7*. Ikkita teng yonli uchburchaklarning asosiari va shu asosga tushirilgan balandliklar tengligiga ko‘ra ularning tengligini isbotlang.





$AC = BC;\quad A_1C_1 = B_1C_1;$

$CD = C_1D_1.\quad AB = A_1B_1 = x;$

$AD = DB = \frac{AB}{2} = \frac{x}{2};\qquad A_1D_1 = D_1B_1 = \frac{A_1B_1}{2} = \frac{x}{2}.$

TBT alomatga ko‘ra, $\Delta ACD = \Delta A_1C_1D_1$ va $\Delta CDB = \Delta C_1D_1B_1.$

Bundan $\Delta ABC = A_1B_1C_1.$ Isbot bo‘ldi.

Uyga vazifa

8. Teng yonli uchburchakning asosi yon tomonidan 3 *cm* katta, lekin yon tomonlarining yig‘indisidan 5 *cm* kichik. Uchburchakning tomonlarini toping.

$\begin{cases} AC = AB + 3 \\ AC = 2AB - 5 \end{cases} \rightarrow AB + 3 = 2AB - 5;$

$2AB - AB = 3 + 5;\quad AB = 8\ cm;\quad BC = 8\ cm;$

$AC = AB + 3\ cm = 8\ cm + 3\ cm = 11\ cm.$

Javob: $AB = 8\ cm;\ BC = 8\ cm;\ AC = 11\ cm.$

2-DARS

I. Standartlar:

M7.GO‘.MM.06. Teng yonli uchburchak, uning elementlarini biladi, xossalarini masalalar yechishda qo‘llay oladi.

II. Dars maqsad. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– teng yonli uchburchak, uning elementlarini bilish;
– xossalarini masalalar yechishda qo‘llay olish.

Ko‘nikmalar:

– teng yonli uchburchak, uning elementlarini biladi;
– xossalarini masalalar yechishda qo‘llay oladi.

III. Dars mazmunining qisqacha tavsifi:

– teng yonli uchburchak va uning elementlari;
– teng yonli uchburchakning xossalari.

IV. Dars ashyolari va ko‘rgazmali qurollar:

– chizg‘ich, uchburchak modellari.

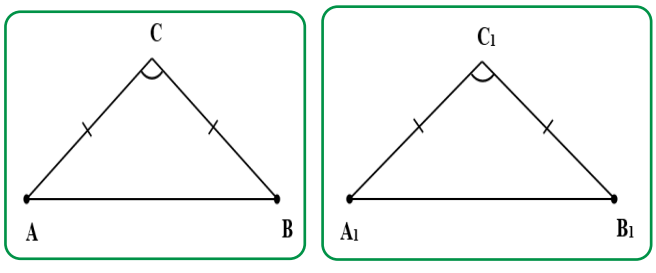
V. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Qanday uchburchakni teng yonli uchburchak deb atash mumkin?	“Aqliy hujum”	Teng yonli uchburchak ta’rifi va xossalarini ayting.
Bilimlarni boyitish va mustahkamlash	Teng yonli uchburchak asosiga tushirilgan bissektrisa haqidagi teorema	Darslikning 83-sahifasidagi teorema va 4-rasm bilan ishlash	1. Teng yonli uchburchak asosiga tushirilgan mediana uning bissektrisasi bo‘ladimi? 2. Amaliy mashq va tatbiq (10, 11, 12).

Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikning 83-sahifasidagi geometrik tadqiqotni bajarish;
Uyga vazifa	1. Teoremani yod olib kelish. 2. Darslikdagi 13-amaliy mashqni yechish.		

Masalalar, yechimlari va ularga doir ko‘rsatmalar

10*. Bir uchburchakning ikki tomoni va bitta burchagi ikkinchi uchburchakning ikki tomoni va bitta burchagiga teng. Bu uchburchaklar teng bo‘ladimi?

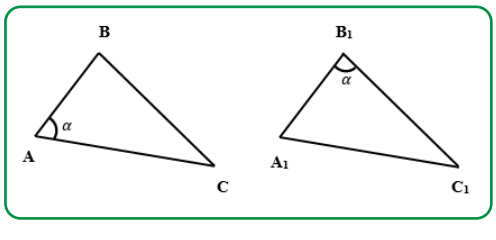


agar $\begin{cases} AC = A_1C_1 \\ BC = B_1C_1 \end{cases}$ da $\angle C = \angle C_1$ bo‘lsa, *TBT* alomatiga ko‘ra teng bo‘ladi.

Agar boshqa burchaklar tengligi haqida gapirilsa teng bo‘lmaydi.

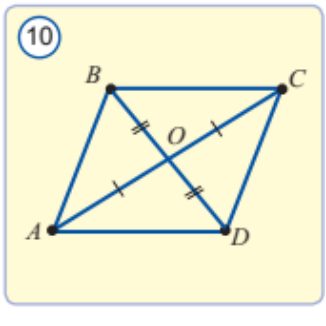
Bir uchburchakning ikki tomoni va ular orasidagi burchak, ikkinchi uchburchakning ikki tomoni va ular orasidagi burchakka teng bo‘lsa, uchburchaklar teng bo‘ladi. Boshqa holda teng bo‘lmaydi.

11*. Shunday ikkita uchburchak chizingki, ulardan birining ikki tomoni va bitta burchagi ikkinchisining ikki tomoni va bitta burchagiga teng bo‘lsin, lekin uchburchaklar teng bo‘lmasin.



$\begin{cases} AB = A_1B_1 \\ AC = A_1C_1 \\ \angle A = \angle B_1 \end{cases}$ bo‘lsa, $\Delta ABC \neq \Delta A_1B_1C_1$ bo‘ladi.

12. Rasmda $AO = OC$ va $BO = OD$. $AB = CD$ va $BC = AD$ ekanligini toping.



$AO = OC;\ BO = OD;\ \angle AOB = \angle COD;$ $\angle BOC = \angle AOD$. TBT alomatga ko‘ra $\Delta AOB = \Delta COD$ va $\Delta BOC = \Delta AOD$. Bundan $AB = CD;\ BC = AD$ mos tomonlar teng ekanligi kelib chiqadi.

UCHBURCHAKLAR TENGLIGINING IKKINCHI ALOMATI (1 soat)

1-DARS

I. Standartlar:

M7.GO‘.MM.07. Uchburchaklar tengligining ikkinchi alomatini tushunadi, alomatga ko‘ra teng uchburchaklarni aniqlay oladi va masalalar yechishda qo‘llay oladi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– uchburchaklar tengligining ikkinchi alomatini tushunish;
– alomatga ko‘ra teng uchburchaklarni aniqlay olish.

Ko‘nikmalar:

– uchburchaklar tengligining ikkinchi alomatini tushunadi;
– alomatga ko‘ra teng uchburchaklarni aniqlay oladi va masalalar yechishda qo‘llay oladi.

III. Dars mazmunining qisqacha tavsifi:

– uchburchaklar tengligining BTB (burchak – tomon – burchak) alomati haqidagi teorema.

IV. Dars ashyolari va ko‘rgazmali qurollar:

– chizg‘ich, uchburchak modellari.

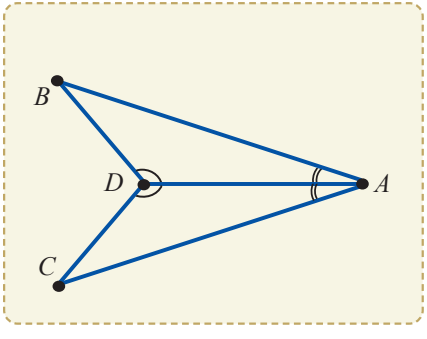
V. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Uchburchaklar tengligining BTB alomati nima haqida?	“Aqliy hujum”	BTB alomatiga ko‘ra, uchburchaklar tengligi qanday elementlar bo‘yicha aniqlanadi?
Bilimlarni boyitish va mustahkamlash	Uchburchaklar tengligining BTB alomatining isboti	Darslikning 85-sahifasidagi teorema bilan ishlash	Amaliy mashq va tatbiq (1, 2, 3, 4).

	Uchburchaklar tengligini xossalar yordamida aniqlash	Darslikdagi 3-, 4-rasmlar bilan ishlash	Amaliy mashq va tatbiq (5, 6).
Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikdagi 7-, 8-amaliy mashqlarni bajarish
Uyga vazifa	1. Uchburchaklar tengligining BTB alomatini yod olib kelish. 2. Darslikdagi 9-, 10-amaliy mashqlarni yechish.		

Masalalar, yechimlari va ularga doir ko‘rsatmalar

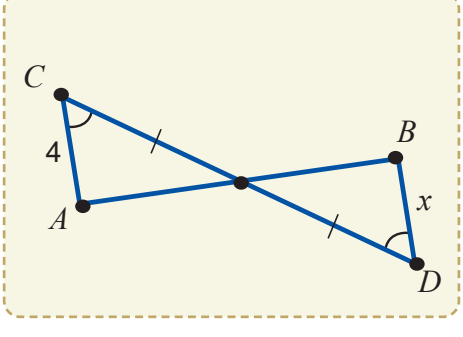
1. Rasmdagi ABD va ACD uchburchaklarning tengligini isbotlang.



$$\begin{cases} \angle ACB = \angle ACD \\ \angle CAB = \angle CAD \\ AC - umumiy\ tomon \end{cases} \rightarrow$$

BTB alomatiga ko‘ra, $\Delta ABC = \Delta ADC$.

2. Rasmdagi noma’lum – x ni toping.



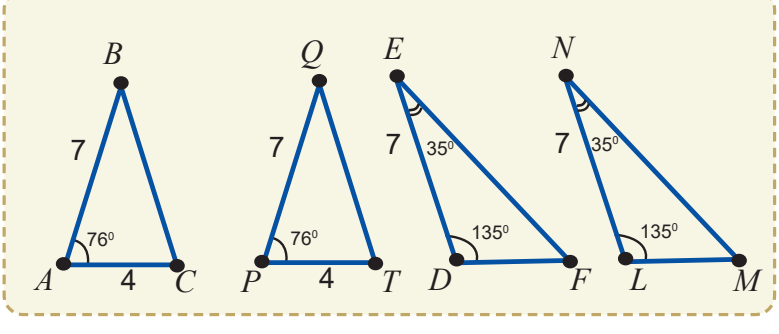
$$\begin{cases} CO = OD \\ \angle ACO = \angle BDO \\ \angle AOC = \angle BOD \end{cases} \rightarrow$$

BTB alomatiga ko‘ra, $\Delta AOC = \Delta BOD$.

$AC = 4;\ BD = x;\ AC = BD = 4$.

Javob: $x = 4$.

3. Rasmdagi uchburchaklarning qaysilari bir biriga teng? Nega?



$\Delta ABC = \Delta QPT$

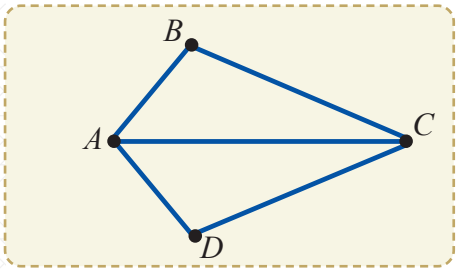
chunki, $\begin{cases} \angle A = \angle P = 76° \\ AB = PQ = 7 \\ AC = PT = 4 \end{cases} \rightarrow$

BTB alomatiga ko‘ra teng.

$\Delta EDF = \Delta NLM$ *chunki,* $\begin{cases} \angle E = \angle N = 35° \\ \angle D = \angle L = 135° \\ ED = NL = 7 \end{cases}$ → BTB alomatiga ko‘ra teng.

Javob: $\angle E = \angle N = 35°;\ \ \angle D = \angle L = 135°;\ \ ED = NL = 7.$

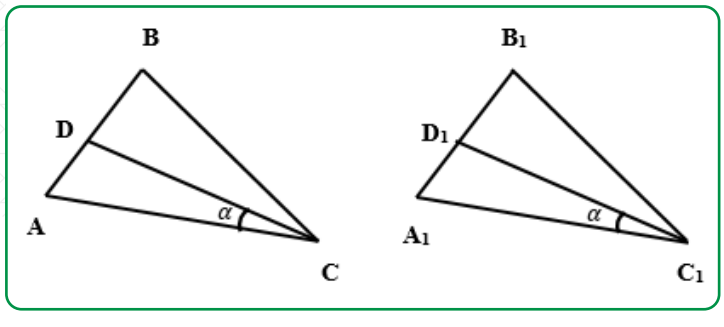
4. Rasmda AC kesma BAD va BCD burchaklarning bissektrisasi bo‘lsa, $\Delta ABC = \Delta ADC$ ekanligini isbotlang.



$AC - bissektrisa$ $\begin{cases} \angle BAC = \angle DAC \\ \angle ACB = \angle ACD \\ AC - umumiy \end{cases}$ →

BTB alomatiga $\Delta ABC = \Delta ACD$ ko‘ra teng.

5. ABC va $A_1\ B_1\ C_1$ uchburchaklarda $AB = A_1\ B_1$, $BC = B_1\ C_1$ va $\angle B = \angle B_1$ ekanligi ma’lum. AB va $A_1\ B_1$ tomonlarda mos ravishda D va D_1 nuqtalar $\angle ACD = \angle A_1\ C_1\ D_1$ bo‘ladigan qilib olingan. Unda $\Delta BCD = \Delta B_1\ C_1\ D_1$ ekanligini isbotlang.



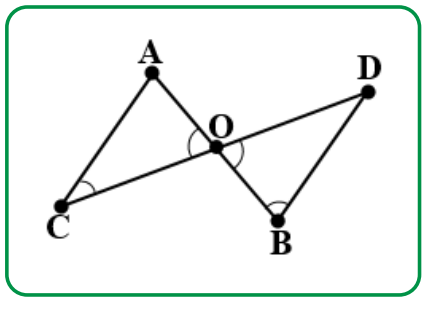
$\begin{cases} AB = A_1B_1 \\ BC = B_1C_1 \\ \angle B = \angle B_1 \end{cases} \rightarrow TBT\ ga\ ko‘ra$

$\Delta ABC = \Delta A_1\ B_1\ C_1$

$AC = A_1\ C_1,\ \angle A = \angle A_1$

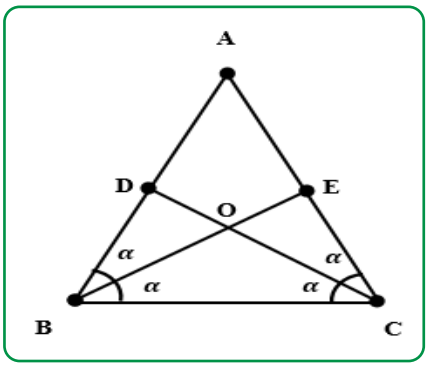
$\begin{cases} \angle ACD = \angle A_1C_1D_1 \\ \angle A = \angle A_1 \\ AC = A_1C_1 \end{cases} \rightarrow BTB\ ga\ ko‘ra\ \ \Delta ADC = \Delta A_1D_1C_1.$

6. AB va CD kesmalar O nuqtada kesishadi. Agar $BO = CO$ va $\angle ACO = \angle DBO$ bo‘lsa, ACO va DBO uchburchaklar teng ekanligini isbotlang.



$\begin{cases} BO = CO \\ \angle ACO = \angle DBO \\ \angle AOC = \angle BOD \end{cases}$ BTB ga ko‘ra $\Delta ACO = \Delta DBO$

7. Rasmdagi ABC uchburchakda $AB = AC$. BE va CD bissektrisalarning teng ekanligini isbotlang.



$AB = AC \quad \rightarrow \quad \angle B = \angle C = 2\alpha;$

$\angle ABE = \angle CBE = \alpha; \qquad \angle BCD = \angle ACD = \alpha;$

ΔBOC-teng yonli $BO = OC. \quad \angle BOD = \angle COE$

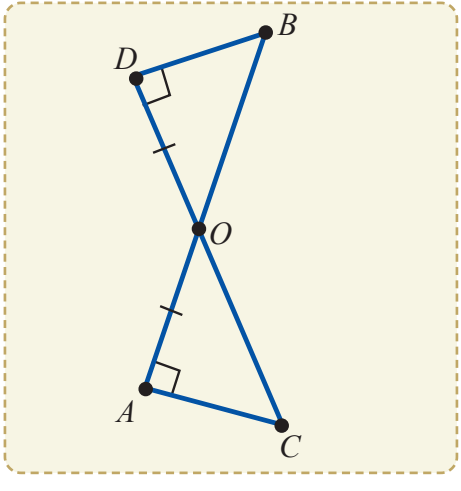
vertikal burchaklar $\begin{cases} BO = CO \\ \angle DBO = \angle ECO \end{cases}$

BTB alomatiga ko‘ra, $\Delta BOD = \Delta COE.$

Demak, $DO = OE$ bo‘ladi.

$BO = OC = x; \quad DO = OE = y; \quad \begin{cases} BE = BO + OE = x + y \\ CD = CO + OD = x + y \end{cases} \rightarrow \quad BE = CD.$

8. $\Delta OAC = \Delta ODB$ bo‘lishini isbotlang.

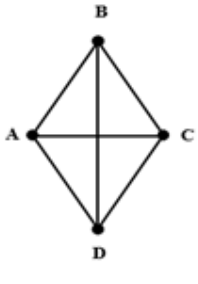


$\begin{cases} OD = OA \\ \angle ODB = \angle OAC = 90° \\ \angle BOD = \angle AOC \end{cases} \rightarrow$

BTB alomatiga ko‘ra, $\Delta BOD = \Delta AOC.$

Uyga vazifa

9. ABC va ADC uchburchaklar teng. B va D nuqtalar AC to‘g‘ri chiziqning turli tomonida yotadi. ABD va BCD uchburchaklar teng yonli ekanligini isbotlang.



$\begin{cases} AC\text{-umumiy} \\ \Delta ABC = \Delta ACD \end{cases} \rightarrow \begin{cases} AB = AD \\ BC = CD \end{cases} \rightarrow \begin{cases} \Delta ABD \text{ teng yonli} \\ \Delta BCD \text{ teng yonli} \end{cases}$

UCHBURCHAKLAR TENGLIGINING UCHINCHI ALOMATI (2 soat)

1-DARS

I. Standartlar:

M7.GO‘.MM.08. Uchburchaklar tengligining uchinchi alomatini tushunadi,alomatga ko‘ra teng uchburchaklarni aniqlay oladi va masalalar yechishda qo‘llay oladi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– uchburchaklar tengligining uchinchi alomatini tushunish;
– alomatga ko‘ra teng uchburchaklarni aniqlay olish.

Ko‘nikmalar:

– uchburchaklar tengligining uchinchi alomatini tushunadi;
– alomatga ko‘ra teng uchburchaklarni aniqlay oladi va masalalar yechishda qo‘llay oladi.

III. Dars mazmunining qisqacha tavsifi:

– uchburchaklar tengligining TTT (tomon – tomon – tomon) alomati haqidagi teorema.

IV. Dars ashyolari va ko‘rgazmali qurollar:

– chizg‘ich, uchburchak modellari.

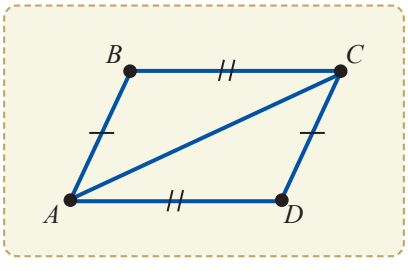
V. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Uchburchaklar tengligining TTT alomati nima haqda	“Aqliy hujum”	6-rasmdan uchburchak shaklidagi qurilmalarni toping. Ular nima sababdan aynan uchburchak shaklda?
Bilimlarni boyitish va mustahkamlash	Uchburchaklar tengligining TTT alomatining isboti	Darslikning 87-sahifasidagi teorema bilan ishlash	1. Uchburchaklar tengligining TTT alomatida uchburchaklar tengligi qanday elementlar bo‘yicha taqqoslab aniqlanadi? 2. Amaliy mashq va tatbiq (1, 2, 3).

	Uchburchaklar tengligini xossalar yordamida aniqlash	Darslikdagi 7-, 8-, 9-rasmlar bilan ishlash	Amaliy mashq va tatbiq (4, 5).
Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikdagi 6-, 7-amaliy mashqlarni bajarish
Uyga vazifa	1. Uchburchaklar tengligining TTT alomatini yod olib kelish. 2. Darslikdagi 8-, 9-amaliy mashqlarni yechish.		

Masalalar, yechimlari va ularga doir ko‘rsatmalar

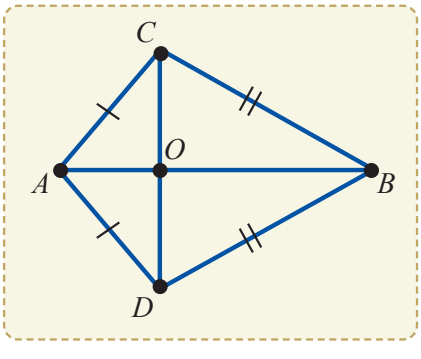
1. Rasmda berilganlarga ko‘ra $\Delta ABC = \Delta CDA$ ekanligini isbotlang.



$$\begin{cases} AB = CD \\ BC = AD \\ AC \text{ -umumiy} \end{cases} \rightarrow \text{TTT alomatiga ko‘ra,}$$

$\Delta ABC = \Delta CDA.$

2. Rasmda: a) $\Delta ABC = \Delta ABD$; b) $\Delta BOC = \Delta BOD$ ekanligini isbotlang.



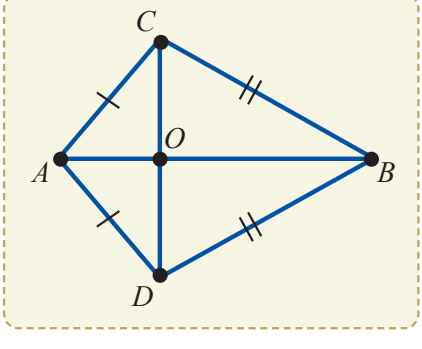
a) $\begin{cases} AC = AD \\ BC = BD \\ AB - umumiy \end{cases} \rightarrow$ TTT alomatiga ko‘ra

$\Delta ABC = \Delta ABD.$

b) $\begin{cases} CO = OD \\ BC = BD \\ BO - umumiy \end{cases} \rightarrow$ TTT alomatiga ko‘ra

$\Delta BOC = \Delta BOD.$

3. Rasmda: a) $\Delta AOC = \Delta AOD$; b) $AB \perp CD$ ekanligini isbotlang.



a) $\begin{cases} CO = OD \\ AC = AD \\ AO - umumiy \end{cases} \rightarrow$ TTT alomatiga ko‘ra

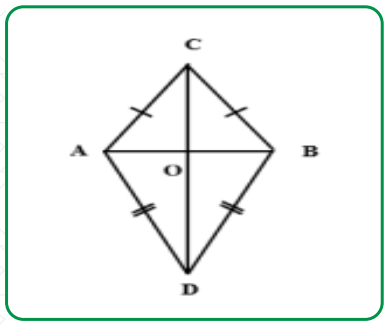
$\Delta AOC = \Delta AOD.$

b) ΔACD da $\begin{cases} AC = AD \\ AO = OD \end{cases} \rightarrow \Delta ACD = \Delta BCD$

bu uchburchaklar buklanganda AO va OB ustma-ust tushadi.

$AO = OB \rightarrow \angle AOC = \angle BOC = 90°$. AO-mediana va balandlik $AO \perp CD$, demak, $AB \perp CD$.

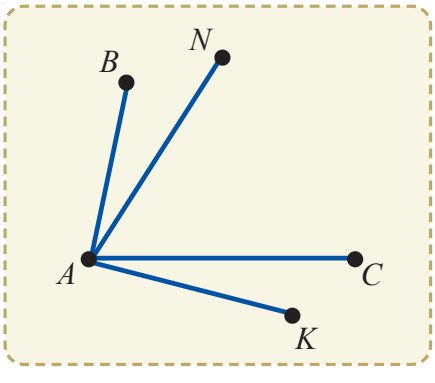
4. ABC va ABD – asoslari AB bo‘lgan teng yonli uchburchaklar bo‘lsa, $\Delta ACD = \Delta BCD$ ekanligini isbotlang.

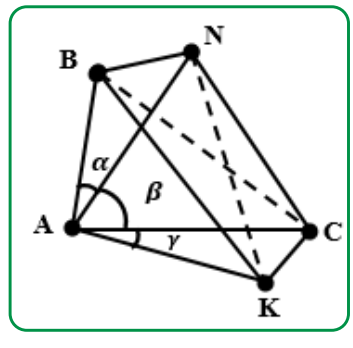


$$\begin{cases} AC = BC \\ BD = AD \\ CD - umumiy \end{cases} \rightarrow \text{TTT alomatiga ko‘ra}$$

$\Delta ACD = \Delta BCD$.

5. Agar rasmda $BA = AK$, $AC = AN$, $\angle BAC = \angle NAK$ bo‘lsa, uchlari A, B, C, K va N nuqtalarda bo‘lgan barcha teng uchburchaklar juftligini aniqlang.





$BA = AK$; $AC = AN$;

$\angle BAC = \angle NAK$;

$\begin{cases} \angle BAC = \alpha + \beta \\ \angle NAK = \beta + \gamma \end{cases}$

$\alpha + \beta = \beta + \gamma$; $\alpha = \gamma$.

1) $\begin{cases} AB = AK \\ AN = AC \\ \angle BAN = \angle CAK \end{cases} \rightarrow$ TBT alomatiga ko‘ra $\Delta ABN = \Delta CAK$ bo‘ladi.

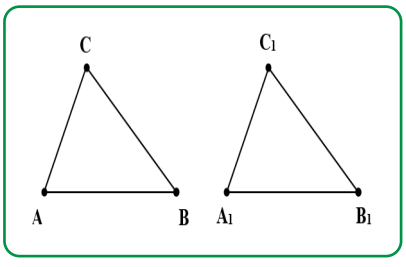
2) $\begin{cases} AB = AK \\ AN = AC \\ \angle BAC = \angle KAN \end{cases} \rightarrow$ TBT alomatiga ko‘ra $\Delta ABC = \Delta CNK$ bo‘ladi.

3) $\begin{cases} BN = CK \\ NK = BC \\ BK - umumiy \end{cases} \rightarrow$ TTT alomatiga ko‘ra $\Delta BNK = \Delta BCK$ bo‘ladi.

4) $\begin{cases} BN = CK \\ BC = NK \\ NC - umumiy \end{cases} \rightarrow$ TTT alomatiga ko‘ra $\Delta BNC = \Delta CKN$ bo‘ladi.

Javob: $\Delta ABN = \Delta CAK;\ \Delta ABC = \Delta CNK;\ \Delta BNK = \Delta BCK;\ \Delta BNC = \Delta CKN;$ $\Delta BAC = \Delta KAN;\ \Delta BAN = \Delta KAC.$

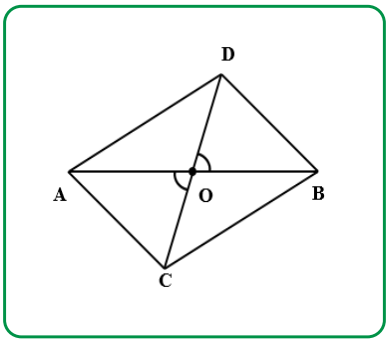
6. ABC va $A_1B_1C_1$ uchburchaklarda $AB = A_1B_1$ va $BC = B_1C_1$ bo‘lib, ularning perimetrlari teng bo‘lsa, $\Delta ABC = \Delta A_1B_1C_1$ ekanligini ko‘rsating.



$$\begin{cases} AB = A_1B_1 \\ BC = B_1C_1 \\ P_{ABC} = P_{A_1B_1C_1} \end{cases} \rightarrow \begin{cases} AB = A_1B_1 \\ BC = B_1C_1 \\ AC = A_1C_1 \end{cases} \rightarrow$$

TTT alomatiga ko‘ra, $\Delta ABC = \Delta A_1B_1C_1$ bo‘ladi.

7.* AB va CD kesmalar kesishish nuqtasida teng ikkiga bo‘linadi. $\Delta ACD = \Delta BDC$ ekanligini isbotlang.



$AO = OB;\ CO = OD;\ \angle AOC = \angle BOD;$

$\angle AOD = \angle BOC;$ TBT alomatiga ko‘ra

$\Delta AOD = \Delta BOC$ va $\Delta AOC = \Delta BOD.$

Demak, $\begin{cases} AC = BD \\ AD = BC \\ CD - umumiy \end{cases} \rightarrow$ TTT alomatiga ko‘ra,

$\Delta ACD = \Delta BCD$ bo‘ladi.

2-DARS

I. Standartlar:

M7.GO‘.MM.09. Uchburchaklar tengligi alomatlarini qo‘llagan holda hisoblash va isbotlashga oid masalalarni yecha oladi.
M7.GO‘.MM.10. Kesmaning o‘rta perpendikulyari xossasini biladi va uni qo‘llay oladi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– uchburchaklar tengligi alomatlarini qo‘llagan holda hisoblash va isbotlashga oid masalalarni yecha olish;
– kesmaning o‘rta perpendikulyari xossasini biladi va uni qo‘llay olish.

Ko‘nikmalar:

– isbotlashga oid masalalarni yecha oladi;
– kesmaning o‘rta perpendikulyari xossasini biladi va uni qo‘llay oladi.

III. Dars mazmunining qisqacha tavsifi:

– kesma o‘rta perpendikulyari tushunchasi va uning xossasi.

IV. Dars ashyolari va ko‘rgazmali qurollar:

– chizg‘ich, uchburchak modellari.

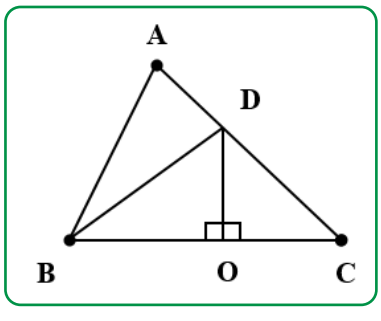
V. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Kesmaning o‘rta perpendikulyari nima?	“Aqliy hujum”	Biror uchburchak chizing va uning har bir tomoniga o‘rta perpendikulyar o‘tkazing. Nimani payqadingiz?
Bilimlarni boyitish va mustahkamlash	Kesma o‘rta perpendikulyarining xossasi	Darslikning 88-sahifasidagi teorema bilan ishlash	1. Kesma o‘rta perpendikulyarining xossasini izohlang 2. Amaliy mashq va tatbiq (10, 11).
	Kesma o‘rta perpendikulyarining xossasini qo‘llash	Darslikdagi 12-, 13-rasmlar bilan ishlash	Amaliy mashq va tatbiq (12, 13).

Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikdagi 14-, 15-amaliy mashqlarni bajarish
Uyga vazifa	1. Kesma o‘rta perpendikulyari haqidagi xossani yodlab kelish. 2. Darslikdagi16-, 17-amaliy mashqlarni yechish.		

Masalalar yechimi va ularga doir ko‘rsatmalar

1. ABC uchburchakning BC tomoniga o‘tkazilgan o‘rta perpendikulyar AC tomonni D nuqtada kesib o‘tadi. Agar $BD = 7{,}2\ cm$, $AD = 3{,}2\ cm$ bo‘lsa, AC nimaga teng?



$BD = 7{,}2\ cm;\ AD = 3{,}2\ cm.$

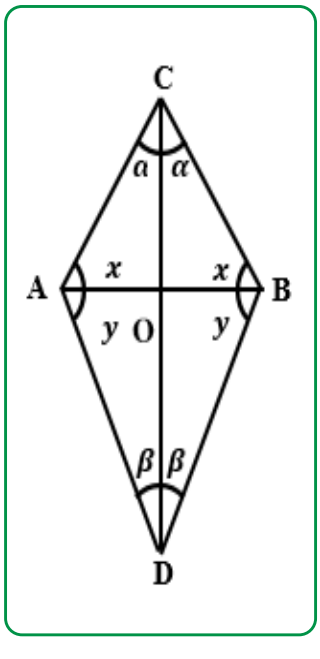
$\begin{cases} BO = OC \\ \angle BOD = \angle COD = 90^\circ \\ OD - umumiy \end{cases} \rightarrow$ TTT alomatiga ko‘ra,

$\Delta BOD = \Delta COD.$ Demak, $BD = DC = 7{,}2\ cm;$

$AC = AD + DC = 3{,}2\ cm + 7{,}2\ cm = 10{,}4\ cm.$

Javob: $AC = 10{,}4\ cm.$

2. ABC va ABD teng yonli uchburchaklar umumiy AB asosga ega. CD to‘g‘ri chiziq AB kesmaning o‘rta perpendikulyari bo‘lishini isbotlang.



$\begin{cases} AC = CB \\ AD = BD \\ CD - umumiy \end{cases} \rightarrow$ TTT alomatiga ko‘ra, $\Delta ACD = \Delta BCD$

Demak, $\angle ACD = \angle BCD = \alpha;\ \angle ADC = \angle BDC = \beta;$

$\angle AOC = \angle BOD;\ \angle BOC = \angle AOD\ ;$

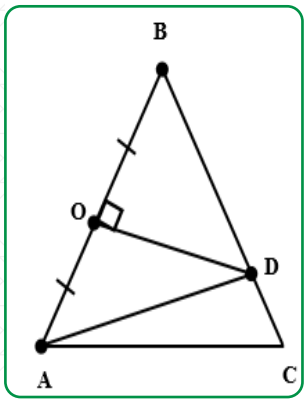
$\angle BOC = \alpha + x;\ \angle AOC = \beta + y;$

$\alpha + x = \beta + y = \varphi;\ \alpha + x = \beta + y = 180^\circ;$

$\varphi + \varphi = 180^\circ;\ 2\varphi = 180^\circ;\ \varphi = 90^\circ.$ Demak,

$AO = OB;\ \varphi = 90^\circ;\ CD$ – o‘rta perpendikulyar.

3*. ABC **teng yonli uchburchakning** AB **yon tomoniga o‘tkazilgan o‘rta perpendikulyar** BC **tomonni** D **nuqtada kesib o‘tadi. Agar** ADC **uchburchakning perimetri 24** cm **ga teng va** AB **= 16** cm **bo‘lsa,** AC **asosni toping.**



$AB = BC = 16\ cm;\quad AO = OB = \frac{AB}{2} = \frac{16\ cm}{2} = 8\ cm;$

$AD + DC + AC = P_{ADC};\qquad AD + DC + AC = 24\ cm;$

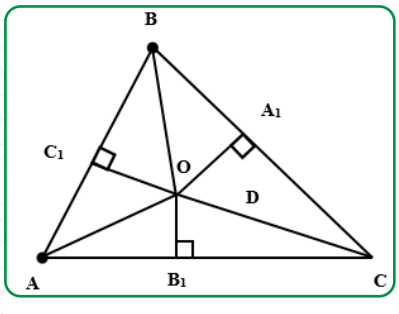
$\begin{cases} BO = OA \\ OD \perp AB \end{cases} \rightarrow \quad BD = AD;\qquad BD + DC = BC;$

$BD + DC + AC = 24;\quad BC + AC = 24;\quad 16 + AC = 24;$

$AC = 24 - 16 = 8\ cm.$

Javob: $AC = 8\ cm.$

4*. Uchburchakning tomonlariga tushirilgan o‘rta perpendikulyar bir nuqtada kesishishini isbotlang.



AC va AB tomonlarning o‘rta perpendikulyarlari O nuqtada kesishsin.

1) $\begin{cases} AB_1 = B_1C \\ OB_1 = AC \\ OB_1 - umumiy \end{cases} \rightarrow \quad AO = OC.$

2) $\begin{cases} AC_1 = C_1B \\ OC_1 = AB \\ OC_1 - umumiy \end{cases} \rightarrow \quad AO = OB.$ Demak, $OB = OC.$

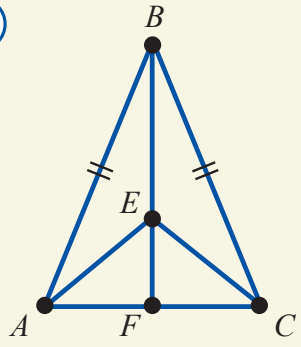
ΔBOC teng yonli uchburchak. O nuqtadan BC tomonga perpendikulyar tushirsak,

$\begin{cases} OA_1 \perp BC \\ OB = OC \end{cases} \rightarrow \quad BA_1 = A_1C.$ Isbot bo‘ldi.

5. Teng yonli ABC **uchburchakning asosiga tushirilgan** BF **bissektrisasida** E **nuqta olingan** ***(12-rasm)***. $\Delta ABE = \Delta CBE$ **tenglikni** ***TTT*** **alomatdan:**

a) foydalanib; b) foydalanmasdan isbotlang.

12



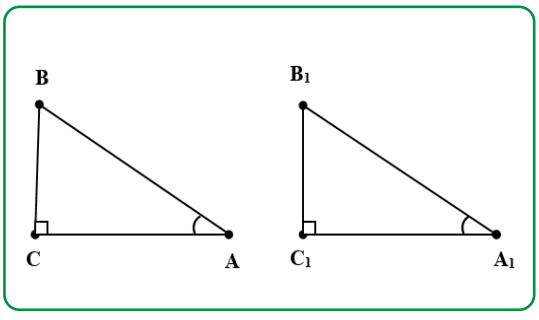
$AB = BC$; BF – bissektrisa, $\angle ABF = \angle CBF = \alpha$;
$\angle BAC = \angle BCA = \beta$; $2\alpha + 2\beta = 180°$;

$$2(\alpha+\beta) = 180°; \quad \alpha+\beta = \frac{180°}{2}; \quad \alpha+\beta = 90°;$$

$$BF \perp AC \rightarrow EF \perp AC \rightarrow \begin{cases} AE = EC \\ AB = BC \\ BE - umumiy \end{cases}$$

TTT alomatiga ko‘ra, $\Delta ABE = \Delta BEC$.

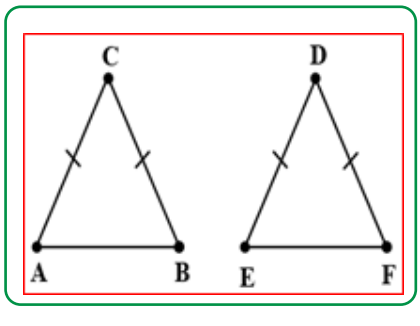
6. ABC va $A_1\ C_1\ B_1$ uchburchaklarda $AB = A_1\ B_1$, $BC = B_1\ C_1$, $CA = C_1\ A_1$, $\angle A = 30°$, $\angle B = 60°$ va $\angle C_1 = 90°$ ekanligi ma’lum. Bu uchburchaklarning qolgan burchaklarini toping.



TTT alomatiga ko‘ra, $\Delta ABC = \Delta A_1\ B_1\ C_1$.
$\angle A = \angle A_1 = 30°$; $\angle B = \angle B_1 = 60°$;
$\angle C = \angle C_1 = 90°$.
Javob: $\angle A_1 = 30°$; $\angle B_1 = 60°$; $\angle C = 90°$.

Uyga vazifa

16. ABC va DEF teng yonli uchburchaklar o‘zaro teng. ABC uchburchakda $AC=BC$ va $AB = 2\ cm$. Agar $DE= 4\ cm$ bo‘lsa, har bir uchburchak perimetrini toping.



$\Delta ABC = \Delta DEF$; $AC = BC$; $AB = 2\ cm$;
$DE = 4\ cm$. $P_{ABC} = ?$, $P_{DEF} = ?$
$AB = EF = 2\ cm$; $AC = BC = DE = DF = 4\ cm$;
$P_{ABC} = AC + BC + AB = 4 + 4 + 2 = 10\ cm$;
$P_{DEF} = DE + DF + EF = 4 + 4 + 2 = 10\ cm$.
Javob: $P_{ABC} = 10\ cm$, $P_{DEF} = 10\ cm$.

III bob. PARALLEL TO‘G‘RI CHIZIQLAR

PARALLEL TO‘G‘RI CHIZIQLAR (2 soat)

1-DARS

I. Standartlar:

M7.GO‘.GSH.12. “To‘g‘ri chiziqlarning parallelligi” tushunchasining mohiyatini tushunadi va chizmada tasvirlay oladi;

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

— “to‘g‘ri chiziqlarning parallelligi” tushunchasining mohiyatini tushunish;
— chizmada tasvirlay olish.

Ko‘nikmalar:

— to‘g‘ri chiziqlarning parallelligi tushunchasining mohiyatini tushunadi;
— chizmada tasvirlay oladi.

III. Dars mazmunining qisqacha tavsifi:

— to‘g‘ri chiziqlarning parallelligi;
— parallellik aksiomasi va uning tarixi.

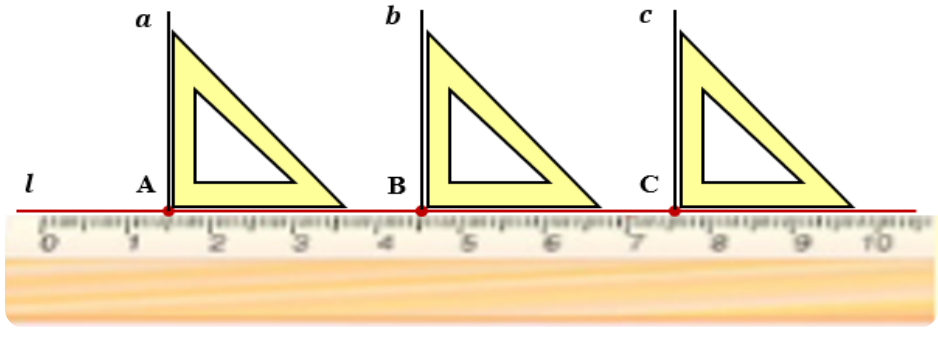
IV. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Qanday to‘g‘ri chiziqlar parallel to‘g‘ri chiziqlar deb ataladi?	“Aqliy hujum”	a va b to‘g‘ri chiziqlarning parallelligi qanday belgilanadi?
Bilimlarni boyitish va mustahkamlash	Bitta to‘g‘ri chiziqqa perpendikulyar bo‘lgan ikki to‘g‘ri chiziq haqidagi teorema	Darslikning 100-sahifasidagi teorema bilan ishlash	1. Berilgan to‘g‘ri chiziqda yotmaydigan nuqta orqali shu to‘g‘ri chiziqqa parallel bo‘lgan nechta to‘g‘ri chiziq o‘tkazish mumkin? 2. Amaliy mashq va tatbiq (1, 2).
	Sakkeri to‘rtburchagi nima?	Darslikning 101-sahifasidagi geometrik tadqiqot	Amaliy mashq va tatbiq (3-, 4-, 5)

Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikdagi 6-, 7-amaliy mashqlarni bajarish;
Uyga vazifa	1. Teorema isbotini o‘rganib kelish. 2. Darslikdagi 8-, 9-amaliy mashqlarni yechish.		

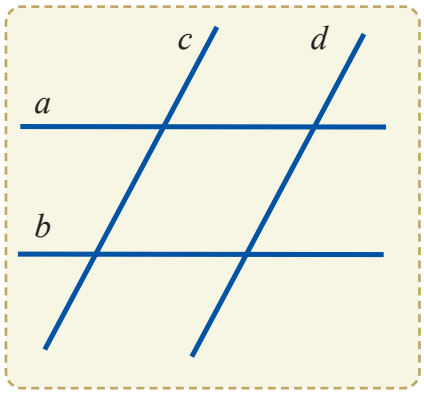
Masalalar, yechimlari va ularga doir ko‘rsatmalar

1. To‘g‘ri chiziq chizib, unda A, B va C nuqtalarni belgilang. Chizg‘ich va uchburchakli chizg‘ich yordamida A nuqtadan, B nuqtadan va C nuqtadan o‘tuvchi va bir-biriga parallel bo‘lgan to‘g‘ri chiziqlarni o‘tkazing.



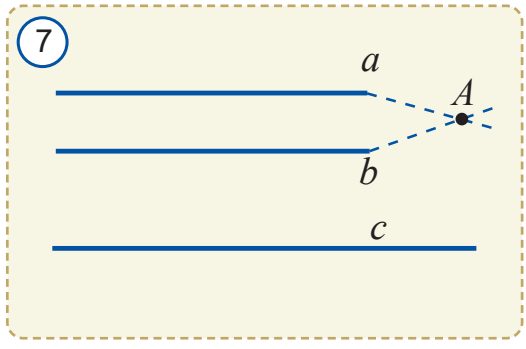
$l \in A;$ $l \in B;$ $l \in C;$
$a \in A;$ $b \in B;$ $c \in C;$
$l \perp a;$ $l \perp b;$ $l \perp c;$
$a \parallel b;$ $b \parallel c;$ $a \parallel c.$

2. Rasmdagi parallel to‘g‘ri chiziqlar juftlarini yozing.



$a \parallel b;$ $c \parallel d.$

3. Uchinchi to‘g‘ri chiziqqa parallel bo‘lgan ikkita to‘g‘ri chiziqning o‘zaro parallel bo‘lishini ko‘rsating.

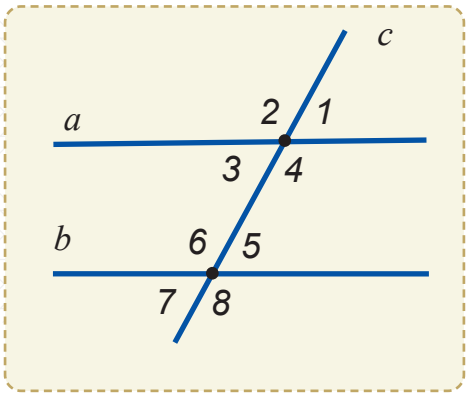


Teorema. Bir to‘g‘ri chiziqqa parallel bo‘lgan ikki to‘g‘ri chiziq o‘zaro paralleldir.

a, b **va** c **to‘g‘ri chiziqlar**, $a||c,\ b||c \rightarrow a||b.$

Isbot. Faraz qilaylik, $a||c$ va $b||c$ bo‘lsa-da, a va b to‘g‘ri chiziqlar parallel bo‘lmasin. U holda ular biror A nuqtada kesishadi *(7-rasm)* va A nuqtadan c to‘g‘ri chiziqqa ikkita – a va b parallel to‘g‘ri chiziq o‘tkazilgan bo‘lib qoladi. Bu esa parallellik aksiomasiga zid. Demak, farazimiz noto‘g‘ri: a va b to‘g‘ri chiziqlar o‘zaro parallel ekan. Teorema isbotlandi.

4. Agar to‘g‘ri chiziq parallel to‘g‘ri chiziqlarning birini kesib o‘tsa, ikkinchisini ham kesib o‘tadimi? Javobingizni asoslang.

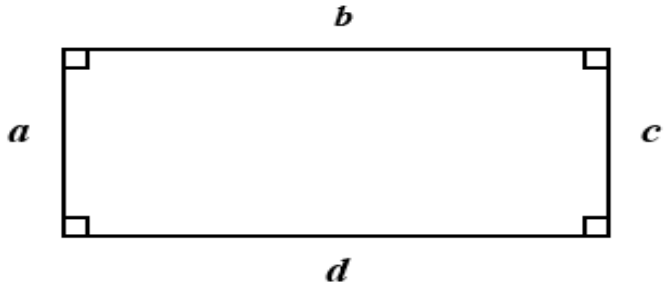


$a \parallel b;\ c \nparallel a$, demak c va b to‘g‘ri chiziqlar kesishadi: $b \nparallel c$.

Demak, b va c ham kesishadi.

Javob: ha, to‘g‘ri chiziq parallel to‘g‘ri chiziqlarning birini kesib o‘tsa, ikkinchisini ham kesib o‘tadi.

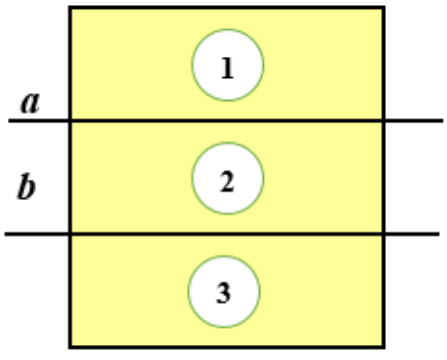
5. To‘g‘ri to‘rtburchakning qarama-qarshi tomonlari o‘zaro parallel ekanligini ko‘rsating.

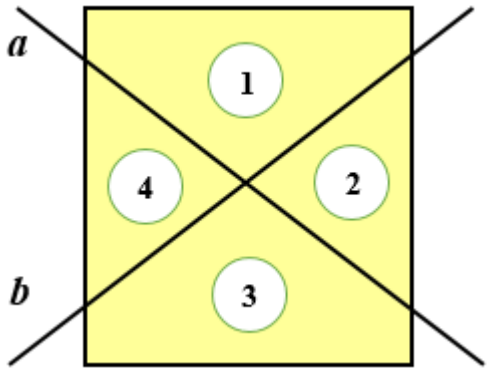


1) $\begin{cases} a \perp b \\ c \perp b \end{cases} \rightarrow$ a || c;

2) $\begin{cases} b \perp a \\ d \perp a \end{cases} \rightarrow$ b || d

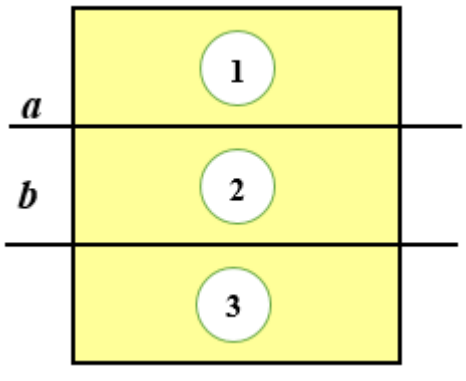
6. Varaqqa ikkita to‘g‘ri chiziq chizildi. Agar varaq bu chiziqlar bo‘ylab qirqilsa, nechta bo‘lak hosil bo‘ladi?





1) $a \parallel b$, 3 ta bo‘lak hosil bo‘ladi. 2) $a \nparallel b$, 4 ta bo‘lak hosil bo‘ladi.

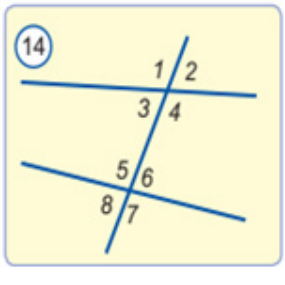
7. Varaqqa ikkita to‘g‘ri chiziqni shunday chizingki, varaq bu chiziqlar bo‘ylab qirqilsa, uchta bo‘lak hosil bo‘lsin.



$a \parallel b$

Uyga vazifa

8. 14-rasmdagi burchaklardan qaysilari vertikal va qaysilari qo‘shni burchak bo‘ladi?



a) Vertikal burchaklar:

$\angle 1$ va $\angle 4$; $\angle 2$ va $\angle 3$; $\angle 5$ va $\angle 7$; $\angle 6$ va $\angle 8$.

b) Qo‘shni burchaklar:

$\angle 1$ va $\angle 2$; $\angle 2$ va $\angle 4$; $\angle 4$ va $\angle 3$; $\angle 3$ va $\angle 1$;

$\angle 5$ va $\angle 6$; $\angle 6$ va $\angle 7$; $\angle 7$ va $\angle 8$; $\angle 8$ va $\angle 5$.

2-DARS

I. Standartlar:

M7.GO‘.MM.11. To‘g‘ri chiziqlarning parallelligi va perpendikulyarligi haqidagi teoremalarni biladi va ulardan masalalar yechishda foydalana oladi;

M7.GO‘.MM.12. Parallel to‘g‘ri chiziqlarga doir masalalarni yecha oladi.

II. Dars maqsadi: O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish.

Bilim:

— to‘g‘ri chiziqlarning parallelligi va perpendikulyarligi haqidagi teoremalarni bilish;
— parallel to‘g‘ri chiziqlarga doir masalalarni yecha olish.

Ko‘nikmalar:

— to‘g‘ri chiziqlarning parallelligi va perpendikulyarligi haqidagi teoremalarni biladi;
— teoremalardan masalalar yechishda foydalana oladi.

III. Dars mazmunining qisqacha tavsifi:

— to‘g‘ri chiziqlarning parallelligi va perpendikulyarligi haqidagi teoremalar;
— ikki to‘g‘ri chiziq va kesuvchi hosil qilgan burchaklar.

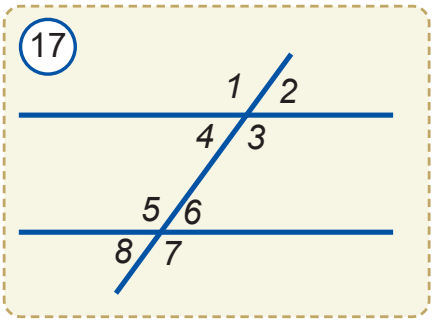
IV. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Ikki to‘g‘ri chiziq va kesuvchi hosil qilgan burchaklar qanday nomlanadi?	“Aqliy hujum”	a va b to‘g‘ri chiziq uchinchi c to‘g‘ri chiziq bilan kesilganda qanday burchaklar juftlari hosil bo‘ladi?
Bilimlarni boyitish va mustahkamlash	Ikki to‘g‘ri chiziq va kesuvchi hosil qilgan burchaklarning xossalari	Darslikning 102-sahifasidagi xossalar bilan ishlash	Amaliy mashq va tatbiq (10, 11).
	Xossalarni qo‘llash	Darslikning 104-sahifasidagi 17-rasm bilan ishlash	Amaliy mashq va tatbiq (12, 13, 14).

Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikdagi 15-, 16-amaliy mashqlarni bajarish
Uyga vazifa	1. Darslikning 104-sahifasidagi geometrik illyuziyani tekshirib ko‘rish. 2. Darslikdagi 17-, 18-, 19-amaliy mashqlarni yechish.		

Masalalar, yechimi va ularga doir ko‘rsatmalar

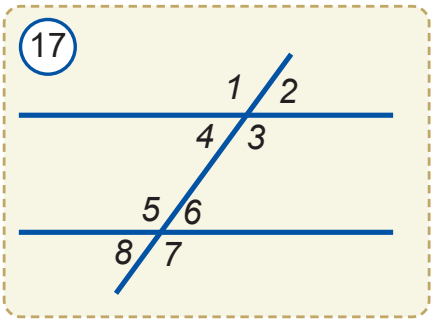
1. Agar 17-rasmda $\angle 2 = \angle 6 = 63°$ bo‘lsa, qolgan burchaklarni toping.



$\angle 6$ va $\angle 5$ qo‘shni burchaklar teng: $\angle 6 + \angle 5 = 180°$; $63° + \angle 5 = 180°$; $\angle 5 = 180° - 63° = 117°$; $\angle 5 = 117°$; $\angle 8$ va $\angle 6$, $\angle 7$ va $\angle 5$ vertikal burchaklar teng: $\angle 8 = \angle 6 = 63°$; $\angle 7 = \angle 5 = 117$.

Javob: $\angle 1 = \angle 3 = \angle 5 = \angle 7 = 117°$; $\angle 4 = \angle 8 = 63°$.

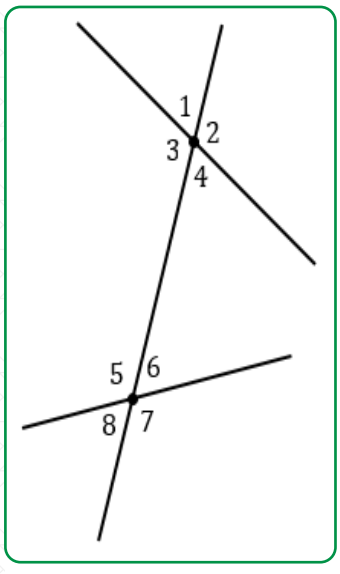
2. Agar 17-rasmda $\angle 1 = \angle 7 = 122°$ bo‘lsa, qolgan burchaklarni toping.



$\angle 1 = \angle 7 = 122°$; $\angle 1$ va $\angle 2$ qo‘shni burchaklar: $\angle 1 + \angle 2 = 180°$; $122° + \angle 2 = 180°$; $\angle 2 = 180° - 122° = 58°$; $\angle 1$ va $\angle 3$, $\angle 2$ va $\angle 4$ vertikal burchaklar teng: $\angle 7$ va $\angle 8$ qo‘shni burchaklar teng: $\angle 7 + \angle 8 = 180°$; $122° + \angle 8 = 180°$; $\angle 8 = 180° - 122° = 58°$; $\angle 8 = 58°$; $\angle 8$ va $\angle 6$, $\angle 7$ va $\angle 5$ vertikal burchaklar teng: $\angle 8 = \angle 6 = 58°$; $\angle 7 = \angle 5 = 122°$;

Javob: $\angle 2 = \angle 4 = \angle 6 = \angle 8 = 58°$; $\angle 3 = \angle 5 = 122°$.

3. Agar ikki to‘g‘ri chiziqni uchinchi to‘g‘ri chiziq bilan kesganda hosil bo‘lgan burchaklardan biri $82°$ va yana biri $110°$ bo‘lsa, qolgan burchaklarni toping.



1) $\angle 1 = 82^\circ$ bo‘lsin, u holda $\angle 1 = \angle 4 = 82^\circ$ vertikal;

$$\begin{cases}\angle 1 + \angle 2 = 180^\circ \\ \angle 1 + \angle 3 = 180^\circ\end{cases} \rightarrow$$ qo‘shni burchaklar $\rightarrow$

$$\begin{cases}\angle 2 = 180^\circ - \angle 1 = 180^\circ - 82^\circ = 98^\circ \\ \angle 3 = 180^\circ - \angle 1 = 180^\circ - 82^\circ = 98^\circ\end{cases} \rightarrow$$

$\angle 2 = \angle 3 = 98^\circ$.

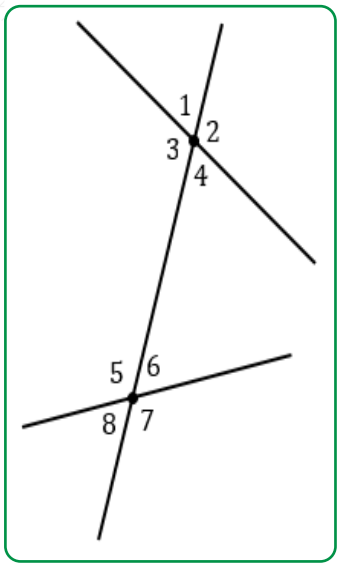
2) $\angle 5 = 110^\circ$ bo‘lsin, u holda $\angle 5 = \angle 7 = 110^\circ$ vertikal;

$$\begin{cases}\angle 5 + \angle 6 = 180^\circ \\ \angle 5 + \angle 8 = 180^\circ\end{cases} \rightarrow$$ qo‘shni burchaklar $\rightarrow$

$$\begin{cases}\angle 6 = 180^\circ - \angle 5 = 180^\circ - 110^\circ = 70^\circ \\ \angle 8 = 180^\circ - \angle 5 = 180^\circ - 110^\circ = 70^\circ\end{cases} \rightarrow \quad \angle 6 = \angle 8 = 70^\circ.$$

Javob: *$\angle 2 = 148^\circ$; $\angle 3 = 148^\circ$; $\angle 4 = 32^\circ$; $\angle 6 = 46^\circ$; $\angle 7 = 134^\circ$; $\angle 8 = 46^\circ$.*

4*. Agar ikki to‘g‘ri chiziqni uchinchi to‘g‘ri chiziq bilan kesganda hosil bo‘lgan burchaklardan biri *32°* va yana biri *134°* bo‘lsa, qolgan burchaklarni toping.



1) $\angle 1 = 32^\circ$ bo‘lsin, u holda $\angle 1 = \angle 4 = 32^\circ$ vertikal;

$$\begin{cases}\angle 1 + \angle 2 = 180^\circ \\ \angle 1 + \angle 3 = 180^\circ\end{cases} \rightarrow$$ qo‘shni burchaklar $\rightarrow$

$$\begin{cases}\angle 2 = 180^\circ - \angle 1 = 180^\circ - 32^\circ = 148^\circ \\ \angle 3 = 180^\circ - \angle 1 = 180^\circ - 32^\circ = 148^\circ\end{cases} \rightarrow$$

$\angle 2 = \angle 3 = 148^\circ$.

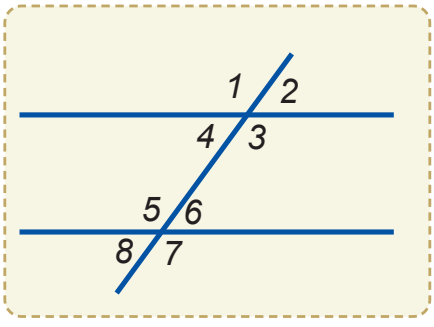
2) $\angle 5 = 134^\circ$ bo‘lsin,u holda $\angle 5 = \angle 7 = 134^\circ$ vertikal;

$$\begin{cases}\angle 5 + \angle 6 = 180^\circ \\ \angle 5 + \angle 8 = 180^\circ\end{cases} \rightarrow$$ qo‘shni burchaklar $\rightarrow$

$$\begin{cases}\angle 6 = 180^\circ - \angle 5 = 180^\circ - 134^\circ = 46^\circ \\ \angle 8 = 180^\circ - \angle 5 = 180^\circ - 134^\circ = 46^\circ\end{cases} \rightarrow \quad \angle 6 = \angle 8 = 46^\circ.$$

6. Rasmda ∠1 = ∠7 bo‘lsa, ∠3 = ∠5 va ∠4 - ∠6 tengliklar bajariladimi? Javobingizni asoslang.

;

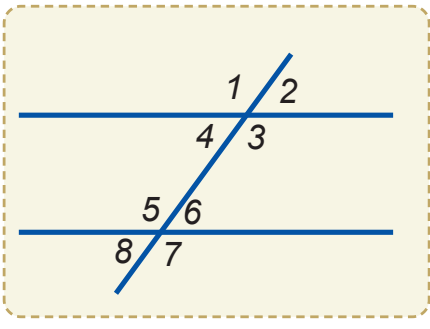


Agar $a \parallel b$ bo‘lsa:

1) $\angle 1 = \angle 7$ tashqi almashinuvchi burchak bo‘lgani uchun

2) $\angle 3 = \angle 5$ ichki almashinuvchi burchak bo‘lgani uchun.

7.* Bir tomonli burchaklar o‘zaro teng bo‘lishi mumkinmi?



$\begin{cases}\angle 1 \text{ va } \angle 8\\ \angle 2 \text{ va } \angle 7\end{cases}$ tashqi bir tomonli burchaklar;

$\begin{cases}\angle 4 \text{ va } \angle 5\\ \angle 3 \text{ va } \angle 6\end{cases}$ ichki bir tomonli burchaklar

Bir tomonli burchaklar yig‘indisi 180° teng.

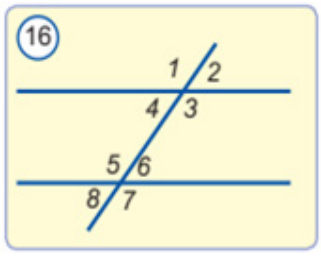
$\angle 1 + \angle 8 = 180°;\ \angle 2 + \angle 7 = 180°;\ \angle 4 + \angle 5 = 180°;\ \angle 3 + \angle 6 = 180°.$

$Agar\ \begin{cases}c \perp a\\ c \perp b\end{cases} \rightarrow bo‘lsagina\ \begin{cases}\angle 1 = \angle 8; & \angle 4 = \angle 5\\ \angle 2 = \angle 7; & \angle 3 = \angle 6\end{cases} bo‘ladi.$

Javob: Bir tomonli burchaklar o‘zaro teng bo‘lishi mumkin.

Uyga vazifa

17*. Almashinuvchi burchaklar teng bo‘lsa, bir tomonli burchaklar yig‘indisi 180° ga tengligini ko‘rsating.



$\begin{cases}\angle 1 \text{ va } \angle 7\\ \angle 2 \text{ va } \angle 8\end{cases}$ tashqi almashinuvchi burchaklar;

$\begin{cases}\angle 4 \text{ va } \angle 6\\ \angle 3 \text{ va } \angle 5\end{cases}$ ichki almashinuvchi burchaklar;

Bir tomonli burchaklar yig‘indisi 180° teng .

Almashinuvchi burchaklar teng bo‘lsa, $a \parallel b$ bo‘ladi.

$\angle 1 = \angle 7 = \alpha;\quad \angle 2 = \angle 8 = \beta;\quad \angle 4 = \angle 6 = \beta;\quad \angle 3 = \angle 5 = \alpha.$

$\alpha + \beta = 180°;\quad \angle 1 + \angle 8 = \alpha + \beta = 180°;\quad \angle 2 + \angle 7 = \beta + \alpha = 180°;$

$\angle 4 + \angle 5 = \beta + \alpha = 180°;\ \angle 3 + \angle 6 = \alpha + \beta = 180°.$

Javob: $\angle 1 + \angle 8 = 180°;\ \angle 2 + \angle 7 = 180°;\ \angle 4 + \angle 5 = 180°;\ \angle 3 + \angle 6 = 180°.$

IKKI TO‘G‘RI CHIZIQNING PARALLELLIK ALOMATLARI (3 soat)

1-DARS

I. Standartlar:

M7.GO‘.GSH.13. Ikki to‘g‘ri chiziq va kesuvchi hosil qilgan burchaklarni tasniflaydi.
M7.GO‘.MM.13. Ikki to‘g‘ri chiziqning parallellik alomatlari haqidagi teorema va uning natijalarini biladi va masalalar yechishda ulardan foydalana oladi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– ikki to‘g‘ri chiziq va kesuvchi hosil qilgan burchaklarni tasniflash;
– ikki to‘g‘ri chiziqning parallellik alomatlari haqidagi teoremani bilish.

Ko‘nikmalar:

– ikki to‘g‘ri chiziq va kesuvchi hosil qilgan burchaklarni tasniflaydi;
– ikki to‘g‘ri chiziqning parallellik alomatlari haqidagi teorema va uning natijalarini biladi va ulardan masalalar yechishda foydalana oladi.

III. Dars mazmunining qisqacha tavsifi:

– ikki to‘g‘ri chiziqning parallellik alomatlari haqidagi teorema va natijalar.

IV. Darsning qisqacha texnologik xaritasi:

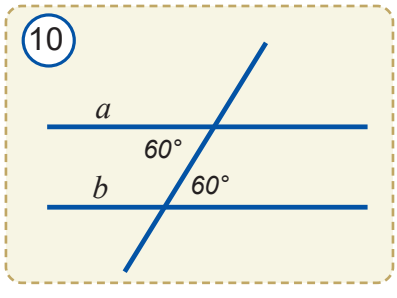
Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Qanday to‘g‘ri chiziqlar parallel to‘g‘ri chiziqlar deb ataladi?	“Aqliy hujum”	9-rasmda a va b to‘g‘ri chiziqlar parallel bo‘lishi uchun noma’lum burchak necha gradus bo‘lishi kerak?
Bilimlarni boyitish va mustahkamlash	Ikki to‘g‘ri chiziqning parallelligini qanday aniqlash mumkin?	Darslikning 105-sahifasidagi teorema bilan ishlash	Amaliy mashq va tatbiq (2, 3).
	Teoremani qo‘llash	Darslikning 105-sahifasidagi 2-, 3-rasmlar bilan ishlash	Amaliy mashq va tatbiq (4, 5).

Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikdagi 6-, 7-amaliy mashqlarni bajarish
Uyga vazifa	1. Teorema isbotini o‘rganib kelish. 2. Darslikdagi 8-, 9-amaliy mashqlarni yechish.		

Masalalar, yechimlari va ularga doir ko‘rsatmalar

1. 10-rasmda $a \parallel b$ bo‘lishini ko‘rsating.

10

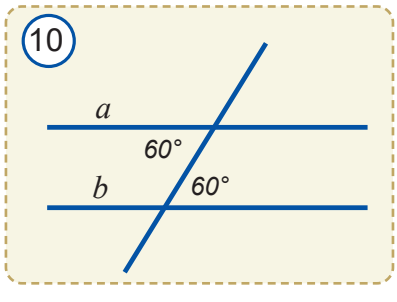


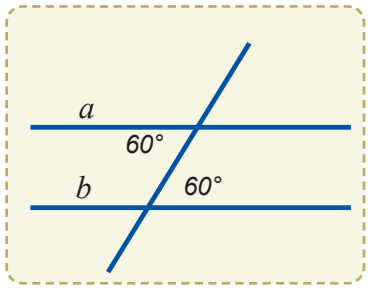
Berilgan: $\alpha = 60°;\ \beta = 60°$.

$\alpha = \beta = 60°$. Ichki almashinuvchi burchaklar bo‘lgani uchun $a \parallel b$ bo‘ladi.

2. 10-rasmda keltirilgan masalaga o‘xshash masala tuzing va uni yeching.

10





$\alpha = x = 60°;$

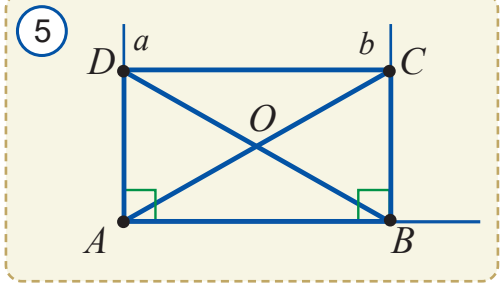
$y + 60° = 180°;$

$y = 180° - 60° = 120°.$

Javob: $x = 60°;\ y = 120°.$

3. 87-bet 5-rasmda qurilgan a va b to‘g‘ri chiziqlar nega parallel bo‘ladi? Javobini yozma izohlang.

5



$\angle BAD = 90°;\ \angle ABC = 90°$

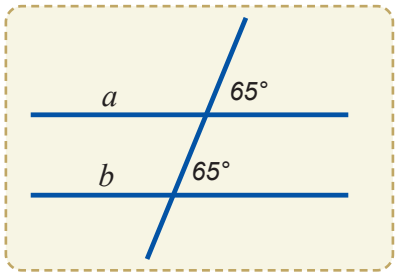
$a \perp AB;\ a \perp CD;\ \angle ADC = 90°;$

$b \perp AB;\ b \perp CD;\ \angle BCD = 90°;$

Bundan $AB \parallel CD,\ AD \parallel BC$.

AD tomon a bilan, BC tomon b bilan ustma-ust tushadi, demak, $a \parallel b$.

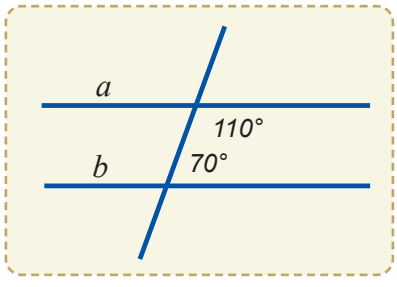
4. Rasmda $a \parallel b$ bo‘lishini ko‘rsating.



$\alpha = 65°;\ \beta = 65°;$

$\alpha = \beta = 65°;$ α va β burchaklar mos bo‘lganligi uchun $a \parallel b$ bo‘ladi.

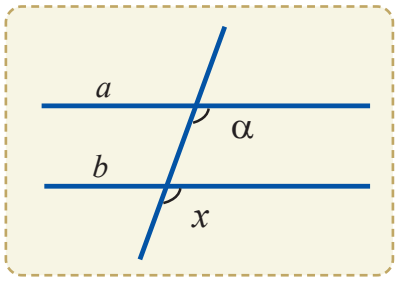
6. Rasmda $a \parallel b$ bo‘lishini ko‘rsating.



$\alpha = 110°;\ \beta = 70°;$

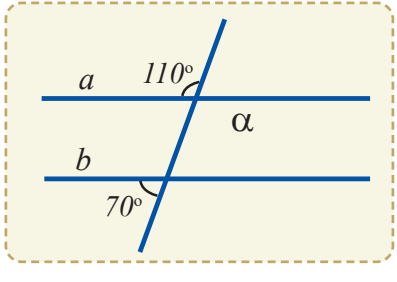
α va β ichnki bir tomonli burchaklar va $\alpha + \beta = 110° + 70° = 180°$ bo‘lgani uchun $a \parallel b$ bo‘ladi.

7. 11–12-rasmlarda keltirilgan masalalarga o‘xshash masala tuzing va uni yeching.



$\alpha = x$ bo‘lsa, $\alpha \parallel \beta$ ni isbotlang.

$\alpha = x$ mos burchaklar bo‘lgani uchun $a \parallel b$ bo‘ladi.



$\alpha = 110°;\ \beta = 70°;$
α va β tashqi bir tomonli burchaklar
va $\alpha + \beta = 110° + 70° = 180°.$
Demak, $a \parallel b$ bo‘ladi.

2-DARS

I. Standartlar:

M7.GO‘.GSH.13. Ikki to‘g‘ri chiziq va kesuvchi hosil qilgan burchaklarni tasniflaydi;

M7.GO‘.MM.13. Ikki to‘g‘ri chiziqning parallellik alomatlari haqidagi teorema va uning natijalarini biladi va ulardan masalalar yechishda foydalana oladi;

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– ikki to‘g‘ri chiziq va kesuvchi hosil qilgan burchaklarni tasniflash;

– ikki to‘g‘ri chiziqning parallellik alomatlari haqidagi teoremani bilish.

Ko‘nikmalar:

– ikki to‘g‘ri chiziq va kesuvchi hosil qilgan burchaklarni tasniflaydi;

– ikki to‘g‘ri chiziqning parallellik alomatlari haqidagi teorema va uning natijalarini biladi va ulardan masalalar yechishda foydalana oladi.

III. Dars mazmunining qisqacha tavsifi:

– ikki to‘g‘ri chiziqning parallellik alomatlari haqidagi teorema va natijalar.

IV. Darsning qisqacha texnologik xaritasi:

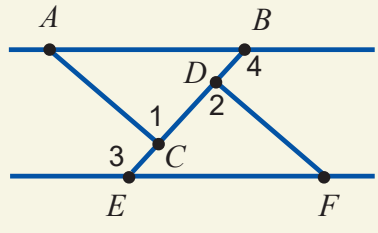
Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Ikki to‘g‘ri chiziq va kesuvchi qanday burchaklarni hosil qiladi?	Tarmoqlash usuli	Ikki to‘g‘ri chiziqning parallellik alomatlarini izohlang.
Bilimlarni boyitish va mustahkamlash	Teoremadan to‘g‘ridan to‘g‘ri kelib chiqadigan xossa	Darslikning 106-sahifasidagi 1-, 2-natijalar bilan ishlash	Amaliy mashq va tatbiq (10, 11).
	Natijalarni qo‘llash	Darslikning 106-sahifasidagi 5-, 6-rasmlar bilan ishlash	Amaliy mashq va tatbiq (12, 13).
Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikdagi 14-, 15-amaliy mashqlarni bajarish

Uyga vazifa	1. Teoremadan kelib chiqadigan natijalarni o‘rganib kelish. 2. Darslikdagi 15-, 16-amaliy mashqlarni yechish.

Masalalar, yechimlari va ularga doir ko‘rsatmalar

1. Agar: 14-rasmda: a) $\angle 3 = \angle 4,\ BD = CE,\ AB = EF$; b) $\angle 1 = \angle 2,\ \angle 3 = \angle 4,\ BD = CE$; c) $AB = EF,\ BD = EC,\ AC = FD$ bo‘lsa, $\Delta ABC = \Delta EFD$ ekanligini ko‘rsating.

14



a) $\angle 3 = \angle 4,\quad BD = CE,\quad AB = EF$.

$$\begin{cases} BC = BD + DC \\ ED = EC + DC \end{cases} \rightarrow \quad BC = ED;$$

$$\begin{cases} \angle ABC = 180° - \angle 4 = 180° - \alpha \\ \angle DEF = 180° - \angle 3 = 180° - \alpha \end{cases}$$

$$\begin{cases} AB = EF \\ BC = ED \\ \angle ABC = \angle DEF \end{cases}$$ TTT alomatiga ko‘ra, $\Delta ABC - \Delta EDF$.

b) $\angle 1 = \angle 2,\ \angle 3 = \angle 4,\ BD = CE$.

$$\begin{cases} AC = DF \\ CD - umumiy \end{cases} \rightarrow \angle ACD = \angle FDC.$$

$$\begin{cases} \angle ABC = 180° - \angle 4 = 180° - \alpha \\ \angle DEF = 180° - \angle 3 = 180° - \alpha \end{cases}$$

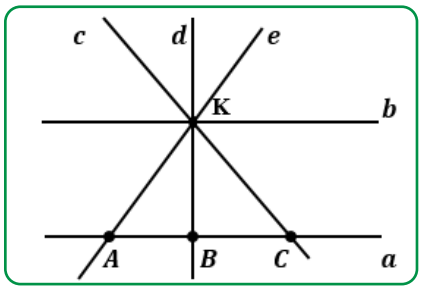
$$\begin{cases} AB = EF \\ BC = ED \\ \angle ABC = \angle DEF \end{cases}$$ TTT alomatiga ko‘ra, $\Delta ABC - \Delta EDF$.

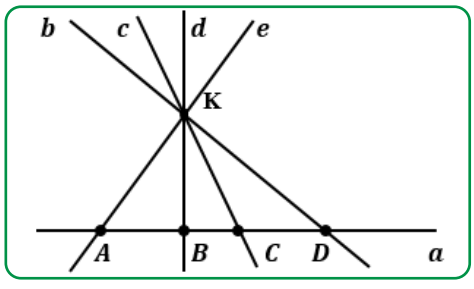
c) $AB = EF,\ BD = EC,\ AC = FD$.

$$\begin{cases} BC = BD + DC \\ ED = EC + DC \end{cases} \rightarrow \quad BC = ED;$$

$$\begin{cases} AB = EF \\ BC = ED \\ AC = \angle FD \end{cases}$$ TTT alomatiga ko‘ra, $\Delta ABC - \Delta EDF$.

2*. a **to‘g‘ri chiziq va unda yotmagan** K **nuqta berilgan.** K **nuqta orqali to‘rtta to‘g‘ri chiziq o‘tkazildi. Bu to‘g‘ri chiziqlardan nechtasi** a **to‘g‘ri chiziq bilan kesishadi?**

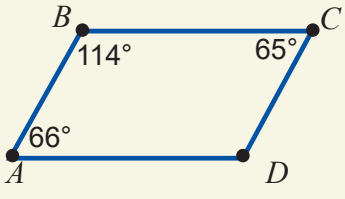




1-hol. 4 ta to‘g‘ri chiziqdan bittasi a to‘g‘ri chiziqqa parallel bo‘lsa, boshqa 3 tasi a to‘g‘ri chiziq bilan kesishadi.

2-hol. 4 ta to‘g‘ri chiziqning hammasi a to‘g‘ri chiziqqa parallel bo‘lmasa, 4 ta to‘g‘ri chiziq ham a to‘g‘ri chiziq bilan kesishadi.

3*. Rasmdagi to‘rtburchakning qaysi tomonlari parallel bo‘ladi?

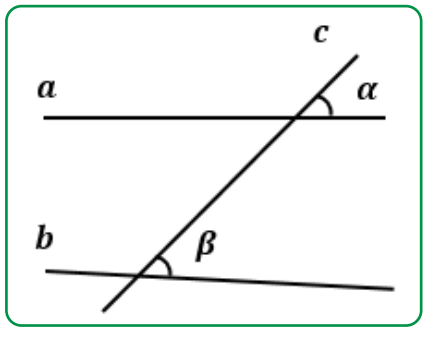


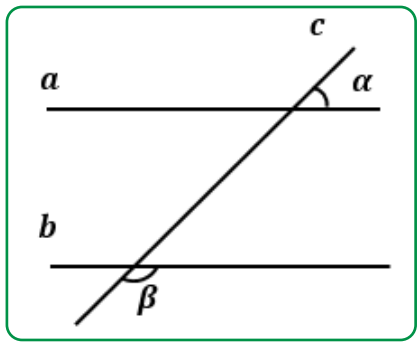
$66° + 114° = 180° \rightarrow AD \parallel BC;$

$65° + 114° = 179° \rightarrow AB \nparallel CD.$

Javob: $AD \parallel BC.$

4. Ikki to‘g‘ri chiziqning kesuvchi bilan kesishishidan hosil bo‘lgan burchaklardan biri: a) $32°$ **va unga mos bo‘lgan burchak esa** $33°$ **ga: b)** $47°$ **va unga mos bir tomonli bo‘lgan burchak esa** $133°$ **ga teng bo‘lsa, bu to‘g‘ri chiziqlar parallel bo‘ladimi?**





a) $\alpha = 32°;\ \beta = 33°.\ \alpha + \beta = 32° + 33° = 65°;\ 65° \neq 180°.$

Demak, $a \nparallel b.$

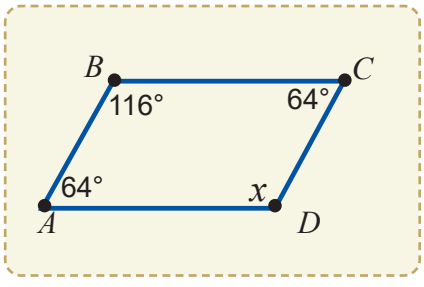
Javob: $a \nparallel b.$

b) $\alpha = 47°;\ \beta = 133°.\ \alpha + \beta = 47° + 133° = 180°;\ 180° = 180°.$

Demak, $a \parallel b$.

Javob: $a \parallel b$.

5. Rasmdagi noma'lum burchakni toping.



$\angle A = 64°;\ \angle B = 116°;\ \angle C = 64°.\ \angle D = x.$

$\angle A + \angle B = 64°+116° = 180° \rightarrow AD \parallel BC;$

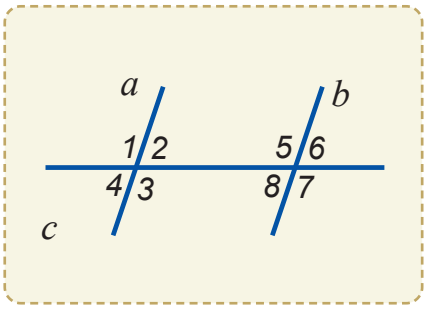
$\angle B+\angle C = 114°+64° = 180° \rightarrow AB \parallel CD;$

$\angle A+\angle D = 180°;\ 64° + x = 180°;$

$x = 180° - 64° = 116°.$

Javob: $x = 116°$.

6. Agar rasmda $\angle 1 = \angle 5 = 105°$ bo'lsa, qolgan burchaklarni toping.



$\angle 1 = \angle 5 = 105°$ mos burchaklar $a \parallel b$

$\angle 3 = \angle 1 = 105°;\ \angle 7 = \angle 5 = 105°;$

$\angle 2 = \angle 4 = 180° - 105° = 75°;$

$\angle 6 = \angle 8 = 180° - 105° = 75°.$

Javob: $\angle 2 = 75°; \angle 3 = 105°; \angle 4 = 75°;$

$\angle 6 = 75°; \angle 7 = 105°; \angle 8 = 75°;$

3-DARS

I. Standartlar:

M7.GO‘.GSH.13. Ikki to‘g‘ri chiziq va kesuvchi hosil qilgan burchaklarni tasniflaydi;

M7.GO‘.MM.13. Ikki to‘g‘ri chiziqning parallellik alomatlari haqidagi teorema va uning natijalarini biladi va masalalar yechishda ulardan foydalana oladi;

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– ikki to‘g‘ri chiziq va kesuvchi hosil qilgan burchaklarni tasniflash;
– ikki to‘g‘ri chiziqning parallellik alomatlari haqidagi teoremani bilish.

Ko‘nikmalar:

– ikki to‘g‘ri chiziq va kesuvchi hosil qilgan burchaklarni tasniflaydi;
– ikki to‘g‘ri chiziqning parallellik alomatlari haqidagi teorema va uning natijalarini biladi hamda masalalar yechishda ulardan foydalana oladi.

III. Dars mazmunining qisqacha tavsifi:

– ikki to‘g‘ri chiziqning parallellik alomatlari haqidagi teorema va natijalar.

IV. Darsning qisqacha texnologik xaritasi:

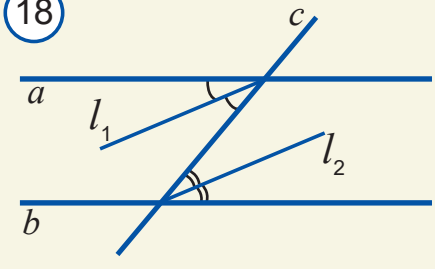
Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Mos burchaklar va bir tomonli burchaklar deganda qanday burchaklarni tushunasiz?	Tarmoqlash usuli	Natija deb nimaga aytiladi? Misol keltiring.
Bilimlarni boyitish va mustahkamlash	Teoremadan to‘g‘ridan to‘g‘ri kelib chiqadigan xossa	Darslikning 106-sahifasidagi 1-, 2 natijalar bilan ishlash;	Amaliy mashq va tatbiq (17).
	Natijalarni qo‘llash	Darslikning 106-sahifasidagi 5-, 6-rasmalar bilan ishlash;	Amaliy mashq va tatbiq (18).

Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikdagi 19-amaliy mashqni bajarish
Uyga vazifa	1. Teoremadan kelib chiqadigan natijalarni o‘rganib kelish. 2. Darslikdagi 20-amaliy mashqni yechish.		

Masalalar, yechimlari va ularga doir ko‘rsatmalar

1*. a va b parallel to‘g‘ri chiziqlarni c to‘g‘ri chiziq bilan kesishdan hosil bo‘lgan almashinuvchi burchaklarning bissektrisalari parallel ekanligini ko‘rsating *(18-rasm).*

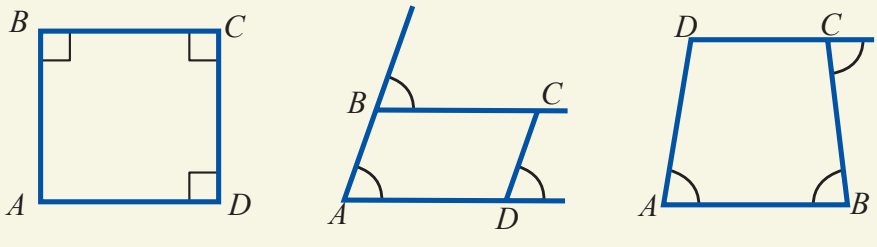
18



$a \parallel b \rightarrow 2\alpha = 2\beta \rightarrow \alpha = \beta.$

α va β burchaklar ichki almashinuvchi ekanligidan l_1 va l_2 bissektrisalar $l_1 \parallel l_2$ ekanligi kelib chiqadi.

18. Rasmlardagi parallel to‘g‘ri chiziqlarni aniqlang.



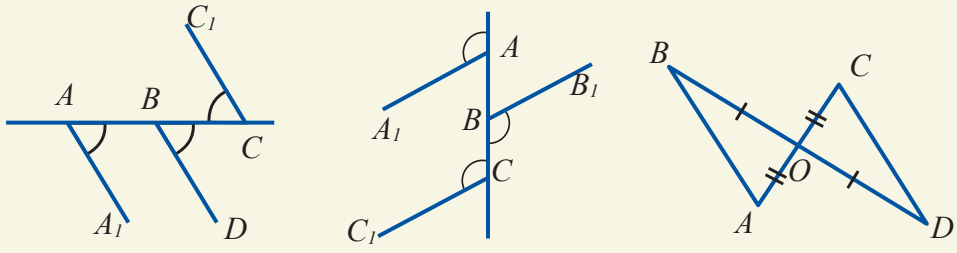
a) $\angle B = \angle C = \angle D = 90°$. Demak, $BC \parallel AD;\ AB \parallel CD.$

б) $\angle B = \angle A$ mos burchak $AD \parallel BC;\ \angle A = \angle D$ mos burchak $AB = DC.$

$\angle A = \angle B$ ichki bir tomonli $\begin{cases} \angle A + \angle B = 180° \\ \angle A = \angle B = 90° \end{cases}$ bo‘lsa, $AD \parallel BD$ bo‘ladi.

Aks holda $AD \parallel BC$ bo‘ladi. $\angle B = \angle C$ ichki almashinuvchi bo‘lgani uchun $AB \parallel CD$ bo‘ladi.

19. Rasmlardagi parallel to‘g‘ri chiziqlarni aniqlang.



a) 1) $\angle A = \angle B$ mos burchaklar $AA_1 \parallel BB_1$ bo‘ladi.

2) $\angle A = \angle C$ ichki almashinuvchi burchaklar $AA_1 \parallel CC_1$ bo‘ladi.

3) $\angle B = \angle C$ ichki almashinuvchi burchaklar $BB_1 \parallel CC_1$ bo‘ladi.

b) 1) $\angle A = \angle B$ tashqi almashinuvchi burchaklar $AA_1 \parallel BB_1$ bo‘ladi.

2) $\angle A = \angle C$ mos burchaklar $AA_1 \parallel CC_1$ bo‘ladi.

3) $\angle B = \angle C$ ichki almashinuvchi burchaklar $BB_1 \parallel CC_1$ bo‘ladi.

c) $AO = OC;\ BO = OD;\ AO + OC = AC;\ BO + OD = BD;$

$\angle AOB = \angle COD;\ \angle AOD = \angle BOC$ vertikal burchaklar.

Demak, $AB = CD,\ \angle ABD = \angle CDB.$ Bundan $AB \parallel CD$ kelib chiqadi.

IKKI PARALLEL TO‘G‘RI CHIZIQ VA KESUVCHI HOSIL QILGAN BURCHAKLAR (3 soat)

1-DARS

I. Standartlar:

M7.GO‘.GSH.14. Ikki parallel to‘g‘ri chiziqlar va kesuvchi hosil qilgan burchaklarni farqlay oladi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– ikki parallel to‘g‘ri chiziqlar haqida tushunchaga ega bo‘lish;
– ikki parallel to‘g‘ri chiziqlar va kesuvchi hosil qilgan burchaklarni farqlay olish.

Ko‘nikmalar:

– ikki parallel to‘g‘ri chiziqlar va kesuvchi hosil qilgan burchaklarni farqlay oladi.

III. Dars mazmunining qisqacha tavsifi:

– to‘g‘ri va teskari teoremalar;
– o‘zaro teng kuchli tasdiqlar.

IV. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Berilgan teoremaga teskari teorema deb nimaga aytiladi?	“Aqliy hujum”	Teskari teoremaning to‘g‘ri teoremadan qanday farqi bor?
Bilimlarni boyitish va mustahkamlash	O‘zaro teng kuchli tasdiqlar	Darslikning 109-sahifasidagi sxema bilan ishlash	Amaliy mashq va tatbiq (1).
	Berilgan tasdiqqa teskari tasdiqni tuzish	Darslikning 109-sahifasidagi 2-mashq bilan ishlash	1. Hosil bolgan teskari tasdiq har doim ham to‘g‘ri bo‘lishi mumkinmi? 2. Amaliy mashq va tatbiq (2).
Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikdagi 3-, 4-, 5-amaliy mashqlarni bajarish;
Uyga vazifa	Darslikdagi 6-, 7-, 8-amaliy mashqlarni yechish.		

Masalalar, yechimlari va ularga doir ko‘rsatmalar

1. Quyidagi tasdiqlarga teskari bo‘lgan tasdiqlarni tuzing. Ularni to‘g‘ri bo‘lish yoki bo‘lmasligini aniqlang:

a) Agar son tub son bo‘lsa, u natural son bo‘ladi.

Agar son natural son bo‘lsa, u tub son bo‘ladi.

Javob: Noto‘g‘ri.

b) Agar son 9 ga bo‘linsa, u 3 ga ham bo‘linadi.

Agar son 3 ga bo‘linsa, u 9 ga ham bo‘linadi.

Javob: Noto‘g‘ri.

d) Agar uchburchaklar teng bo‘lsa, ularning mos burchaklari ham teng bo‘ladi.

Agar uchburchakning mos burchaklari teng bo‘lsa, bu uchburchaklar teng bo‘ladi.

Javob: Noto‘g‘ri.

e) Agar o‘quvchining harorati yuqori bo‘lsa, u kasal bo‘lib qolgan bo‘ladi.

Agar o‘quvchi kasal bo‘lgan bo‘lsa, uning harorati baland bo‘ladi.

Javob: Noto‘g‘ri.

f) Agar futbolchi qizil kartochka olgan bo‘lsa, o‘yindan chiqib ketadi.

Agar futbolchi o‘yindan chiqib ketsa, u qizil kartochka olgan bo‘ladi.

Javob: har doim ham emas

g) Agar uchburchakning tomonlari 3, 4 va 5 ga teng bo‘lsa, uning perimetri 12 ga teng bo‘ladi.

Agar uchburchakning perimetri 12 ga teng bo‘lsa, uning tomonlari 3, 4 va 5 ga teng bo‘ladi.

Javob: ba’zan.

h) Agar avtomobilning benzini bo‘lmasa, u yurmaydi.

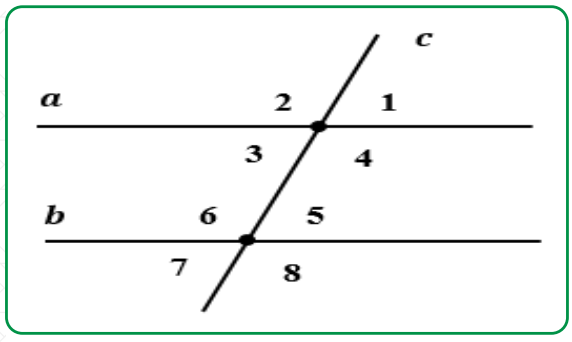
Agar avtomobil yurmasa, uning benzini bo‘lmaydi.

Javob: Noto‘g‘ri.

2. Quyidagi teoremalarga teskari teoremalarni tuzing va ularning to‘g‘riligini tekshiring:

a) Agar ikki to‘g‘ri chiziqni kesuvchi bilan kesishishidan hosil bo‘lgan mos burchaklar teng bo‘lsa, u holda bu to‘g‘ri chiziqlar parallel bo‘ladi.

Agar ikki to‘g‘ri chiziq parallel bo‘lsa, kesuvchi bilan kesishishidan hosil bo‘lgan mos burchaklar teng bo‘ladi.



$a \parallel b.$

$\angle 1 = \angle 5$

$\angle 4 = \angle 8$

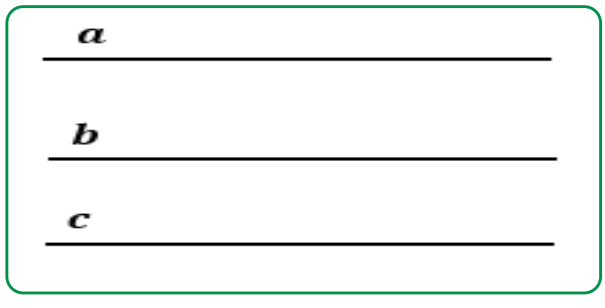
$\angle 2 = \angle 6$

$\angle 3 = \angle 7.$

Javob: to‘g‘ri.

b) Agar ikki to‘g‘ri chiziq uchinchi to‘g‘ri chiziqqa parallel bo‘lsa, ular parallel bo‘ladi.

Agar ikki to‘g‘ri chiziq parallel bo‘lsa, bu ikki to‘g‘ri chiziq uchinchi to‘g‘ri chiziqqa parallel bo‘ladi.



$a \parallel b$

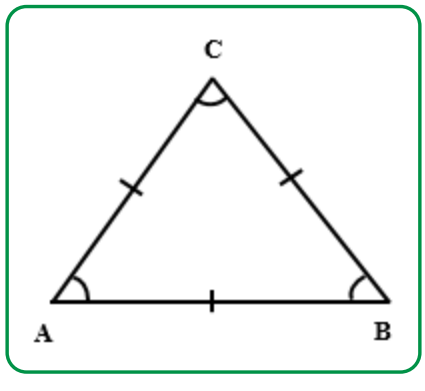
$b \parallel c$

$a \parallel c$

Javob: to‘g‘ri.

d) Agar uchburchak teng tomonli bo‘lsa, uning barcha burchaklari o‘zaro teng bo‘ladi.

Agar uchburchak barcha burchaklari o‘zaro teng bo‘lsa, bu uchburchak teng tomonli bo‘ladi.



$\angle A = \angle B;$ $AC = BC;$

$\angle B = \angle C;$ $AB = AC;$

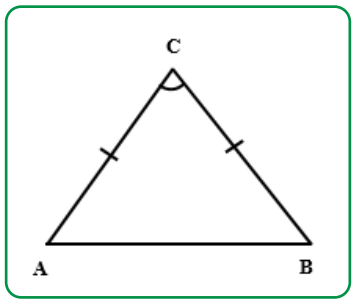
$\angle A = \angle C;$ $AB = BC.$

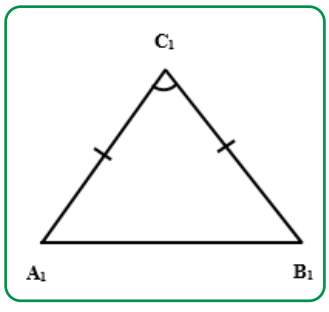
$AB = BC = AC.$

Javob: to‘g‘ri.

3. Uchburchaklarning tenglik alomatlariga teskari teoremalarni tuzing. Ular to‘g‘rimi?

a) Agar ikkita uchburchak teng bo‘lsa, ularning ikkita tomoni va ular orasidagi burchaklar teng bo‘ladi.





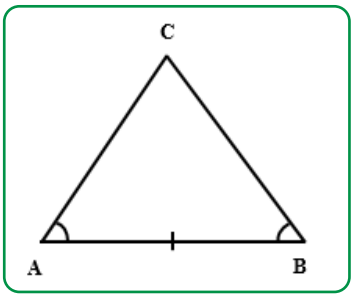
$\Delta ABC = \Delta A_1 B_1 C_1$

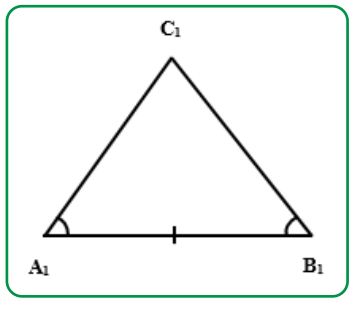
$AC = A_1 C_1$; $BC = B_1 C_1$;

$\angle C = \angle C_1$.

Javob: To‘g‘ri.

b) Agar ikkita uchburchak teng bo‘lsa, ularning ikkita burchagi va ular orasidagi tomoni teng bo‘ladi.





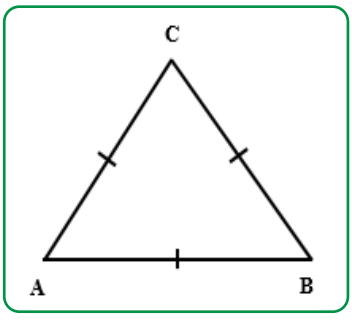
$\Delta ABC = \Delta A_1 B_1 C_1$

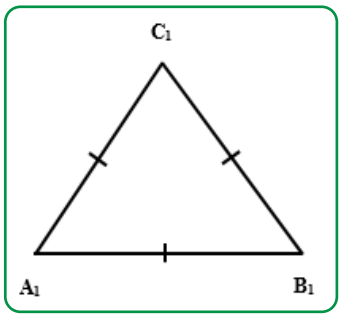
$\angle A = \angle A_1$; $\angle B = \angle B_1$.

$AB = A_1 B_1$.

Javob: To‘g‘ri.

c) Agar ikkita uchburchaklar teng bo‘lsa, ularning tomonlari ham teng bo‘ladi.





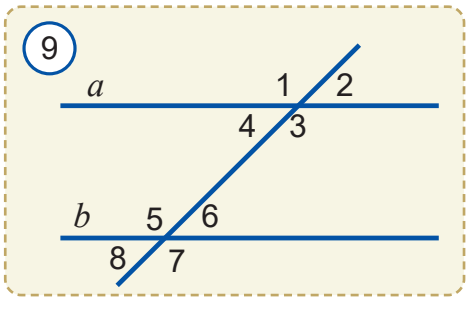
$\Delta ABC = \Delta A_1 B_1 C_1$

$AB = A_1 B_1$; $BC = B_1 C_1$;

$AC = A_1 C_1$.

Javob: To‘g‘ri.

4. 9-rasmda $a \parallel b$, $\angle 1 = 135°$. Qolgan burchaklarni toping.



$a \parallel b$; $\angle 1 = 135°$.

$\angle 1 = \angle 3 = 135°$ vertikal burchaklar;

$\angle 1 = \angle 5 = 135°$ mos burchaklar;

$\angle 5 = \angle 7 = 135°$ vertikal burchaklar;

$\angle 1 + \angle 2 = \angle 1 + \angle 4 = 180°$ qo‘shni burchaklar;

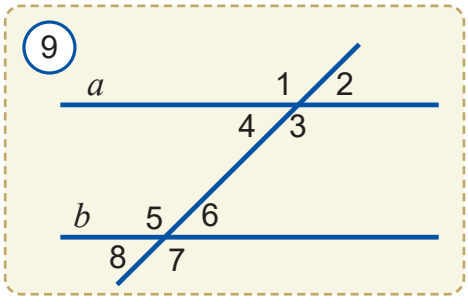
$\angle 2 = \angle 4 = 180° - 135° = 45°$; $\angle 6 = \angle 2 = 45°$ mos burchaklar;

$\angle 8 = \angle 6 = 45°$ vertikal burchaklar.

Javob: $\angle 2 = 45°$; $\angle 3 = 135°$; $\angle 4 = 45°$; $\angle 5 = 135°$;

$\angle 6 = 45°$; $\angle 7 = 135°$; $\angle 8 = 45°$.

5. 9-rasmda $a \parallel b$, $\angle 2 = 49°$. Qolgan burchaklarni toping.



$a \parallel b;\ \angle 2 = 49°$.

$\angle 2 = \angle 4 = 49°$ – vertikal burchaklar ;

$\angle 1 + \angle 2 = \angle 1 + \angle 4 = 180°$ – qo‘shni burchaklar;

$\angle 1 = \angle 3 = 180° - 49° = 131°;\ \angle 6 = \angle 2 = 49°$ – mos burchaklar;

$\angle 5 = \angle 1 = 131°$ – mos burchaklar;

$\angle 8 = \angle 6 = 131°$ – vertikal burchaklar.

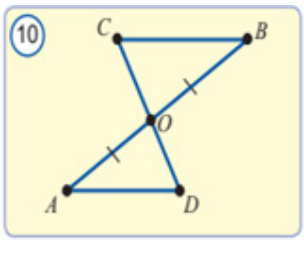
Javob: $\angle 1 = 131°;\ \angle 3 = 131°;\ \angle 4 = 49°;\ \angle 5 = 131°;$

$\angle 6 = 49°;\ \angle 7 = 131°;\ \angle 8 = 49°.$

Uyga vazifa

6. 10-rasmda $BC \parallel AD$, $AO = OB$ ekanligi ma’lum.

a) $DO = OC$; b) $\Delta AOD = \Delta COB$ tengliklarni isbotlang.



a) Berilgan: $BC \parallel AD;\ \ AO = OB$.

Isbotlang: $DO = OC$.

$\angle AOD = \angle BOC = \alpha$ vertikal burchak;

$\begin{cases} \angle ADO = \angle BCO = \beta \\ \angle DAO = \angle CBO = \gamma \end{cases}$ almashinuvchi;

$\begin{cases} AO = OB \\ \angle DAO = \angle CBO \\ \angle AOD = \angle BOC \end{cases} \rightarrow$ BTB alomatiga ko‘ra $\Delta AOD = \Delta BOC$ bo‘ladi.

Demak, $DO = OC$ ekanligi kelib chiqadi.

b) Berilgan: $BC \parallel AD;\ \ AO = OB$. Isbotlang: $\Delta AOD = \Delta COB$.

$BC \parallel AD;\ \ AO = OB.\ \ \angle AOD = \angle BOC = \alpha$ vertikal burchak

$\begin{cases} \angle ADO = \angle BCO = \beta \\ \angle DAO = \angle CBO = \gamma \end{cases}$ almashinuvchi burchak;

$\begin{cases} AO = OB \\ \angle DAO = \angle CBO \\ \angle AOD = \angle BOC \end{cases} \rightarrow$ BTB alomatiga ko‘ra $\Delta AOD = \Delta BOC$ bo‘ladi

2-DARS

I. Standartlar:

M7.GO‘.GSH.14. Ikki parallel to‘g‘ri chiziqlar va kesuvchi hosil qilgan burchaklarni farqlay oladi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– ikki parallel to‘g‘ri chiziqlar haqida tushunchaga ega bo‘lish;
– ikki parallel to‘g‘ri chiziqlar va kesuvchi hosil qilgan burchaklarni farqlay olish.

Ko‘nikmalar:

– ikki parallel to‘g‘ri chiziqlar va kesuvchi hosil qilgan burchaklarni farqlay oladi;

III. Dars mazmunining qisqacha tavsifi:

– ikki parallel to‘g‘ri chiziqlar va kesuvchi hosil qilgan burchaklar;
– ikki to‘g‘ri chiziqning parallellik alomatlariga teskari bo‘lgan teoremalar.

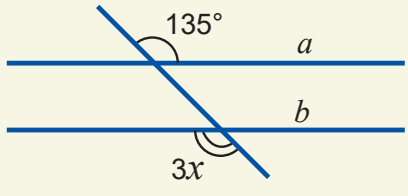
IV. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Berilgan teoremaga teskari teorema deb nimaga aytiladi	“Aqliy hujum”	Teskari teoremaning to‘g‘ri teoremadan qanday farqi bor?
Bilimlarni boyitish va mustahkamlash	Agar to‘g‘ri chiziq parallel to‘g‘ri chiziqlardan biriga perpendikulyar bo‘lsa, ikkinchisiga ham perpendikulyar bo‘ladimi?	Darslikning 110-sahifasidagi natija bilan ishlash	Amaliy mashq va tatbiq (9, 10).
	Ikki parallel to‘g‘ri chiziq va kesuvchi hosil qilgan burchaklar xossalari	Darslikning 110-sahifasidagi 1- va 2-teoremalar bilan ishlash	Ikki parallel to‘g‘ri chiziq va kesuvchi hosil qilgan almashinuvchi, mos va bir tomonli burchaklar haqida nima deyish mumkin?

			2. Amaliy mashq va tatbiq (11, 12).
Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Mavzu bo‘yicha savollar: - Darslikdagi 13-, 14-, 15-amaliy mashqlarni bajarish;
Uyga vazifa	Darslikdagi 16-, 17-amaliy mashqlarni yechish.		

Masalalar, yechimlari va ularga doir ko‘rsatmalar

1. Rasmda $a \parallel b$ bo‘lsa, x ni toping.

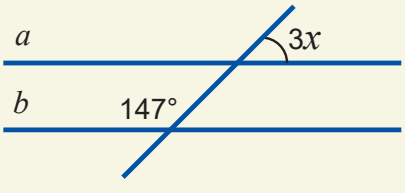


$3x = 135°$ tashqi almashinuvchi burchak .

$x = \frac{135°}{3}; \quad x = 45°.$

Javob: $x = 45°$.

2. Rasmda $a \parallel b$ bo‘lsa, x ni toping.



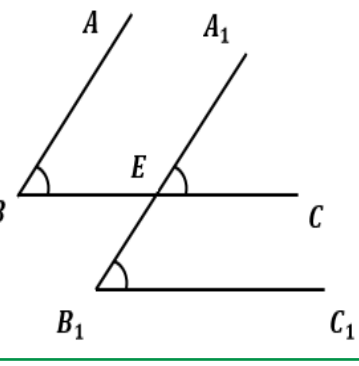
$\alpha = 3x$ mos burchak.

$\alpha + 147° = 180°; \quad 3x + 147° = 180°;$

$3x = 180° - 147°; \quad 3x = 33°; \quad x = 11°.$

Javob: $x = 11°$.

3*. ABC va $A_1B_1C_1$ o‘tkir burchaklar berilgan. Agar $AB \parallel A_1B_1$ va $BC \parallel B_1C_1$ bo‘lsa, $\angle ABC = \angle A_1B_1C_1$ bo‘lishini isbotlang.



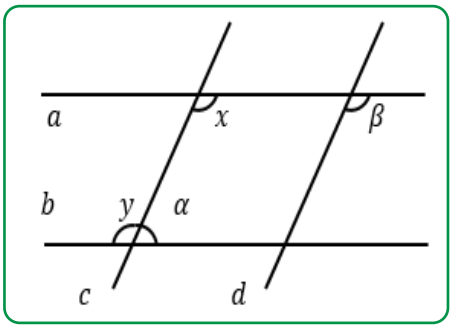
Berilgan: $AB \parallel A_1B_1; \quad BC \parallel B_1C_1.$

$\begin{cases} \angle ABC = \alpha \\ AB \parallel A_1B_1 \end{cases} \rightarrow \angle A_1EC = \alpha;$

$\begin{cases} \angle A_1EC = \alpha \\ BC \parallel B_1C_1 \end{cases} \rightarrow \angle A_1B_1C_1 = \alpha;$

Demak, $\angle ABC = \angle A_1B_1C_1$. Isbot bo‘ldi.

4*. Mos tomonlari parallel to‘g‘ri chiziqlarda yotgan burchaklardan biri o‘tkir, ikkinchisi esa o‘tmas. Bu burchaklar yig‘indisi $180°$ ga teng bo‘lishini isbotlang.

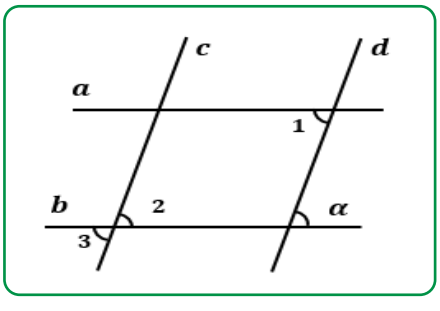


$a \parallel b;\ c \parallel d;$ { α-o‘tkir burchak; β-o‘tmas burchak bo‘lsin

$x = \beta$ mos burchak, $y = x = \beta$ ichki almashinuvchi burchaklar. Demak, $y + \alpha = 180°$.

Eslatma. *13-masalalarda keltirilgan teoremalar mos tomonlari parallel bo‘lgan burchaklarning xossalari deb yuritiladi.*

5. Agar 15-rasmda $a \parallel b$, $c \parallel d$ va $\angle 1 = 55°$ bo‘lsa, $\angle 2$ va $\angle 3$ ni toping.



$a \parallel b,\ c \parallel d,\ \angle 1 = 55°.\ \angle 2 = ?,\ \angle 3 = ?$

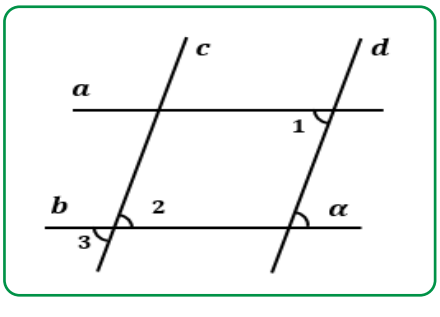
$\alpha = \angle 1 = 55°$ – ichki almashinuvchi burchaklar;

$\angle 2 = \alpha = 55°$ – mos burchaklar.

$\angle 3 = \angle 2 = 55°$ – vertikal burchaklar.

Javob: $\angle 2 = 55°,\ \angle 3 = 55°$.

6. Agar 15-rasmda $a \parallel b$, $c \parallel d$ va $\angle 1 = 73°$ bo‘lsa, $\angle 1$ va $\angle 2$ ni toping.



$a \parallel b,\ c \parallel d,\ \angle 3 = 73°.\quad \angle 1 = ?,\quad \angle 2 = ?$

$\angle 2 = \angle 3 = 73°$ – vertikal burchaklar.

$\alpha = \angle 2 = 73°$ – mos burchaklar;

$\angle 1 = \alpha = 73°$ – ichki almashinuvchi burchaklar;

Javob: $\angle 1 = 73°,\ \angle 2 = 73°$.

3-DARS

I. Standartlar:

M7.GO‘.GSH.14. Ikki parallel to‘g‘ri chiziqlar va kesuvchi hosil qilgan burchaklarni farqlay oladi;

II. Dars maqsadi: O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish.

Bilim:

– ikki parallel to‘g‘ri chiziqlar haqida tushunchaga ega bo‘lish;
– ikki parallel to‘g‘ri chiziqlar va kesuvchi hosil qilgan burchaklarni farqlay olish.

Ko‘nikmalar:

– ikki parallel to‘g‘ri chiziqlar va kesuvchi hosil qilgan burchaklarni farqlay oladi;

III. Dars mazmunining qisqacha tavsifi:

– ikki parallel to‘g‘ri chiziqlar va kesuvchi hosil qilgan burchaklar;
– ikki to‘g‘ri chiziqning parallellik alomatlariga teskari bo‘lgan teoremalar.

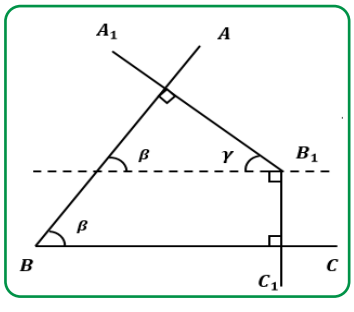
IV. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Berilgan teoremaga teskari bo‘lgan teorema nima bo‘ladi?	“Aqliy hujum”	Mavzu bo‘yicha savollar: -Teskari teoremaning to‘g‘ri teoremadan qanday farqi bor?
Bilimlarni boyitish va mustahkamlash	Agar to‘g‘ri chiziq parallel to‘g‘ri chiziqlardan biriga perpendikulyar bo‘lsa, ikkinchisiga ham perpendikulyar bo‘ladimi?	Darslikning 110-sahifasidagi natija bilan ishlash	Amaliy mashq va tatbiq (18, 19).
	Ikki parallel to‘g‘ri chiziq va kesuvchi hosil qilgan burchaklar xossalari	Darslikning 110-sahifasidagi 1-, 2-teoremalar bilan ishlash	1. Ikki parallel to‘g‘ri chiziq va kesuvchi hosil qilgan almashinuvchi, mos va bir tomonli burchaklar haqida nima deyish mumkin? 2. Amaliy mashq va tatbiq (20, 21).

Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikdagi 22-, 23-, 24-amaliy mashqlarni bajarish
Uyga vazifa	Darslikdagi 25-, 26-, 27-amaliy mashqlarni yechish.		

Masalalar, yechimlari va ularga doir ko‘rsatmalar

1*. Mos tomonlari perpendikulyar to‘g‘ri chiziqlarda yotgan burchaklardan biri o‘tkir, ikkinchisi esa o‘tmas. Bu burchaklar yig‘indisi 180^o ga teng bo‘lishini isbotlang.



$\beta + \gamma + 90° = 180°;\ \gamma = 90° - \beta;\ \angle B = \beta;$

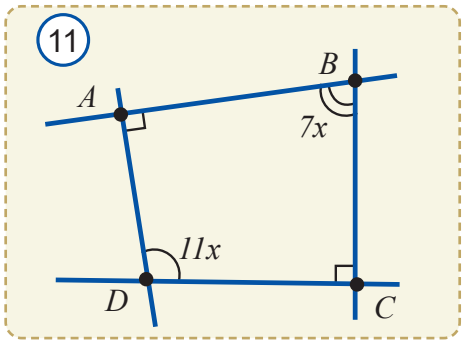
$\angle B_1 = 90° + \gamma = 180° - \beta;$

$\angle B + \angle B_1 = \beta + 180° - \beta = 180°.$

$\angle B + \angle B_1 = 180°$ isbot bo‘ldi.

Eslatma. *17-, 18-masalalarda keltirilgan teoremalar mos tomonlari o‘zaro perpendikulyar bo‘lgan burchaklarning xossalari deb yuritiladi.*

2*. 16-rasmdagi ABC va ADC burchaklarning mos tomonlari perpendikulyar. Noma’lum burchaklarni toping.



$AB \perp AD;\quad BC \perp CD;\ \angle B = 7x;\ \angle D = 11x.$

$\angle A = \angle C = 90°;\ \angle A + \angle B + \angle C + \angle D = 360°;$

$90° + 7x + 90° + 11x = 360°;$

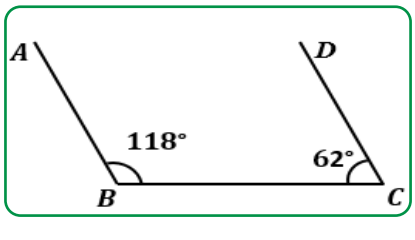
$180° + 18x = 360°;\quad 18x = 360° - 180°;$

$18x = 180°;\quad x = 10°;$

$\angle B = 7x = 7 \cdot 10° = 70°;\ \angle D = 11x = 11 \cdot 10° = 110°.$

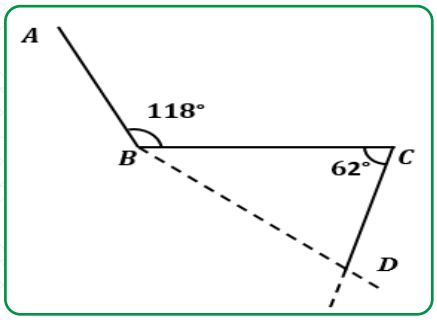
Javob: $\angle B = 70°;\ \angle D = 110°.$

3. ABC burchak $118°$ ga teng. BCD burchak esa $62°$ ga teng. AB va CD to‘g‘ri chiziqlar a) parallel bo‘lishi; b) kesishishi mumkinmi?



a) $\angle ABC$ va $\angle BCD$ ichki bir tomonlama burchaklarda $\angle ABC + \angle BCD = 180°.$

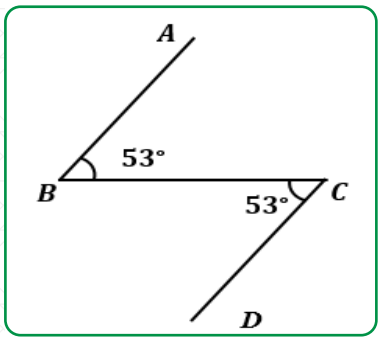
Demak, $AB \parallel CD$ bo‘lishi mumkin.



b) $AB \nparallel CD$ chunki $\angle ABC$ va $\angle BCD$ ichki almashinuvchi burchaklar teng emas.

Demak, AB va CD to‘g‘ri chiziqlar kesishishi mumkin.

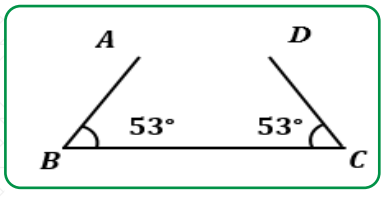
4. ABC burchak $53°$ ga teng. BCD burchak ham $53°$ ga teng. AB va CD to‘g‘ri chiziqlar a) parallel bo‘lishi; b) kesishishi mumkinmi?



a) $\angle ABC = \angle BCD = 53°$.

$\angle ABC$ va $\angle BCD$ ichki almashinuvchi burchaklar.

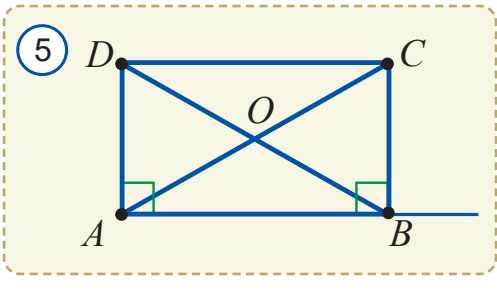
Demak, $AB \parallel CD$ bo‘lishi mumkin.



b) $\angle ABC + \angle BCD \neq 180°$.

Demak, $AB \nparallel CD$, ular kesishishi mumkin.

5*. 87-betda keltirilgan Sakkeri to‘rtburchagining to‘g‘ri to‘rtburchak ekanligini isbotlang.



$$\begin{cases} \angle A = \angle B = 90° \\ AD = BC \\ AB - umumiy \end{cases}$$

TBT alomatiga ko‘ra,

$\Delta ADB = \Delta ABC.$

$$Ya'ni \begin{cases} AC = BD \\ \angle ADB = \angle ACB = \beta \\ \angle ABD = \angle BAC = \alpha \end{cases}$$ lar kelib chiqadi. $\alpha + \beta = 90°$.

Demak, $AO = OB$.

Bu ma’lumotlardan $DO = OC$ kelib chiqadi.

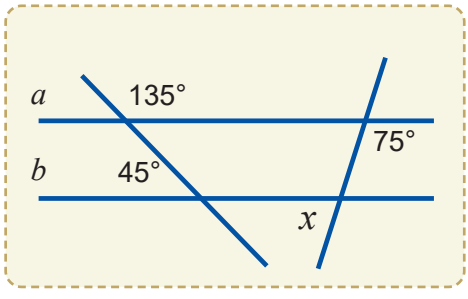
$$\begin{cases} \angle ADO = \angle BCO = \beta \\ \angle AOD = \angle BOC \\ DO = OC \end{cases}$$

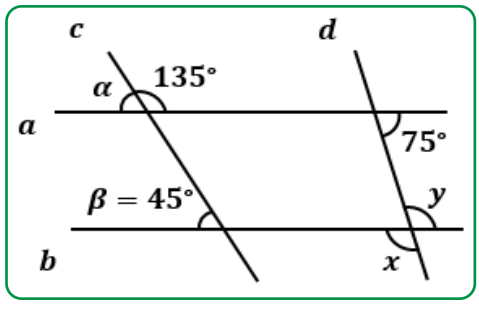
BTB alomatiga ko‘ra, $\Delta AOD = \Delta BOC$.

$AO = OD = CO = BD;\ \angle ODC = \angle OCD = \alpha$ kelib chiqadi.

$\angle D = \angle C = \alpha + \beta = 90°$. Demak, $ABCD$ to‘g‘ri to‘rtburchak ekan.

6. Rasmdagi x burchaklarni toping.





Qo‘shni burchaklar: $\alpha + 135° = 180°;\quad \alpha = 180° - 135° = 45°;$

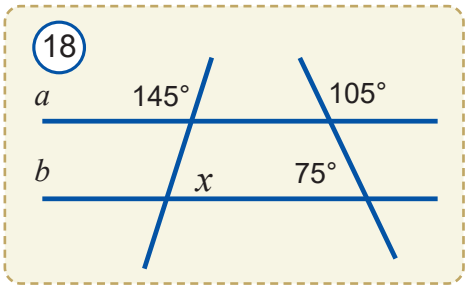
$\alpha = \beta = 45°$ – mos burchaklar. Demak, $a \parallel b$ ekanligi kelib chiqadi.

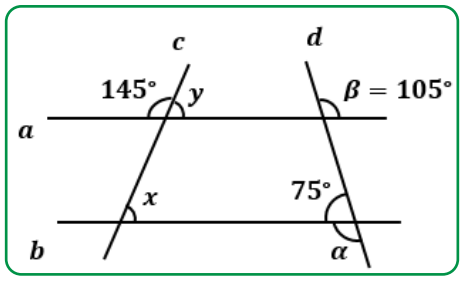
$y = x$ – vertikal burchaklar; $y+75° = 180°$ – ichki bir tomonli burchaklar;

$y = 180° - 75° = 105°;\ y = 105°;\ x = 105°.$

Javob: $x = 105°$.

7. Rasmdagi x burchaklarni toping.





Qo‘shni burchaklar $\alpha + 75° = 180°;\ \alpha = 180° - 75° = 105°;$
$\alpha = \beta = 105°$ – tashqi almashinuvchi burchaklar. Demak, $a \parallel b$ ekanligi kelib chiqadi. Qo‘shi burchaklar: $145° + y = 180°;\ y = 180° - 145° = 35°;$
$x = y = 35°$ – mos burchaklar; $x = 35°$.
Javob: $x = 35°$.

IV bob. UCHBURCHAKNING TOMONLARI VA BURCHAKLARI ORASIDAGI MUNOSABATLAR

UCHBURCHAK ICHKI BURCHAKLARI YIG‘INDISI. (3 soat)

1-DARS

I. Standartlar:

M7.GO‘.MM.14. Uchburchak ichki burchaklari yig‘indisi haqidagi teoremani va uning natijalarini isbotlay oladi.

II. Dars maqsadi: O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– uchburchak ichki burchaklari yig‘indisi haqidagi teoremani bilish;
– uning natijalarini isbotlay olish.

Ko‘nikmalar:

– uchburchak ichki burchaklari yig‘indisi haqidagi teoremani va uning natijalarini isbotlay oladi.

III. Dars mazmunining qisqacha tavsifi:

– uchburchak ichki burchaklarining yig‘indisi haqidagi teorema.

IV. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Uchburchak ichki burchaklarining yig‘indisi haqida nima deya olasiz?	“Aqliy hujum”	2-faollashtiruvchi mashqni bajarish
Bilimlarni boyitish va mustahkamlash	Uchburchak ichki burchaklarining yig‘indisi haqidagi teorema	Darslikning 124-sahifasidagi teorema bilan ishlash	1. Uchburchakning ko‘pi bilan nechta burchagi to‘g‘ri bo‘lishi mumkin? 2. Amaliy mashq va tatbiq (1, 2, 3).
	Uchburchak ichki burchaklarini topish	Darslikning 125-sahifasidagi 1-, 2-natijalar bilan ishlash	Amaliy mashq va tatbiq (4, 5, 6).

Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikdagi 7-, 8-, 9-amaliy mashqlarni bajarish;
Uyga vazifa	1. Darslikdagi 3-savolga javob berish. 2. Darslikdagi 10-, 11-amaliy mashqlarni yechish.		

Masalalar, yechimlari va ularga doir ko‘rsatmalar

Agar uchburchakning ikkita burchagi a) 60° va 40°; b) 70° va 85°; c) 90° va 45°; d) 105° va 30° bo‘lsa, uning uchinchi burchagini toping.

a) Berilgan: $\alpha = 60°;\ \ \beta = 40°$. Topish kerak: $\gamma = ?$

$\alpha + \beta + \gamma = 180°;\ 60° + 40° + \gamma = 180°;\ 100° + \gamma = 180°;$

$\gamma = 180° - 100° = 80°;\ \gamma = 80°.$

Javob: $\gamma = 80°$.

b) Berilgan: $\alpha = 70°;\ \beta = 85°$. Topish kerak: $\gamma = ?$

$\alpha + \beta + \gamma = 180°;\ 70° + 85° + \gamma = 180°;\ 155° + \gamma = 180°;$

$\gamma = 180° - 155° = 25°;\ \ \gamma = 25°.$

Javob: $\gamma = 25°$.

c) Berilgan: $\alpha = 90°;\ \beta = 45°$. Topish kerak: $\gamma = ?$

$\alpha + \beta + \gamma = 180°;\ 90° + 45° + \gamma = 180°;\ 135° + \gamma = 180°;$

$\gamma = 180° - 135° = 45°;\ \gamma = 45°.$

Javob: $\gamma = 45°$.

d) Berilgan: $\alpha = 105°;\ \beta = 30°$. Topish kerak: $\gamma = ?$

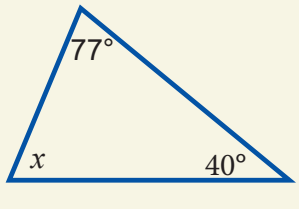
$\alpha + \beta + \gamma = 180°;\ \ 105° + 30° + \gamma = 180°;\ 135° + \gamma = 180°;$

$\gamma = 180° - 135° = 45°;\ \ \gamma = 45°.$

Javob: $\gamma = 45°$.

2. Rasmdagi noma’lum burchakni toping.

a)



$77° + 40° + x = 180°;\ \ 117° + x = 180°;$

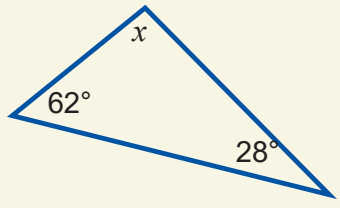
$x = 180° - 117° = 63°;\ x = 63°.$

Javob: $x = 63°$.

$62° + 28° + x = 180°;\ 90° + x = 180°;$

$x = 180° - 90° = 90°;\ x = 90°.$

b)

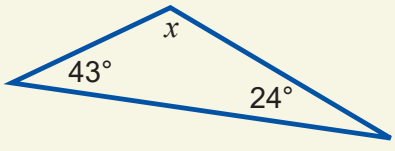


$43° + 24° + x = 180°;\ \ 67° + x = 180°;$

$x = 180° - 67° = 113°;\ \ x = 113°.$

Javob: $x = 113°.$

c)

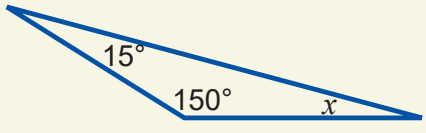


$15° + 150° + x = 180°;\ \ 165° + x = 180°;$

$x = 180° - 165° = 15°;\ \ x = 15°.$

Javob: $x=15°.$

d)



3. Uchburchak ikkita burchagining yig‘indisi $78°$ ga teng. Uchinchi burchagini toping.

Berilgan: $\alpha + \beta = 78°$. Topish kerak: $\gamma = ?$

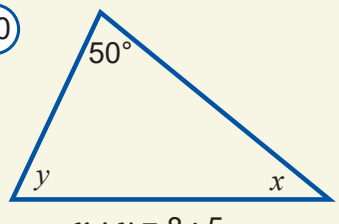
$\alpha + \beta + \gamma = 180°;\ \ 78° + \gamma = 180°;\ \ \gamma = 180° - 78° = 102°;$

$\gamma = 102°.$

Javob: $\gamma = 102°.$

4. 10-rasmdagi noma’lum burchaklarni toping.

10



$x : y = 8 : 5$

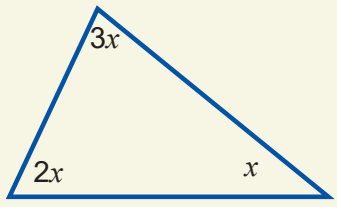
$x : y = 8 : 5;\ \ x = 8\alpha;\ \ \ y = 5\alpha\ ;$

$x + y + 50° = 180°;\ \ 8\alpha + 5\alpha + 50° = 180°;$

$13\alpha = 180° - 50°;\ \ 13\alpha = 130°;\ \ \alpha = 10°;$

$x = 8\alpha = 8 \cdot 10° = 80°;\ \ y = 5\alpha = 5 \cdot 10° = 50°.$

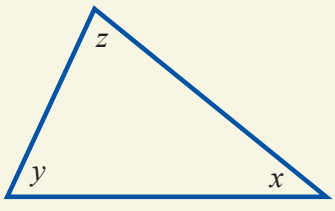
Javob: $x = 80°,\ \ y = 50°.$



$3x + 2x + x = 180°;\ \ 6x = 180°;\ \ x = 30°;$

$3x = 3 \cdot 30° = 90°;\ \ \ 2x = 2 \cdot 30° = 60°.$

Javob: $90°,\ \ 60°,\ \ 30°.$



$x : y : z = 5 : 6 : 7$

$x : y : z = 5 : 6 : 7;\ \ x = 5\alpha;\ \ y = 6\alpha;\ \ z = 7\alpha;$

$x + y + z = 180°;\ \ 5\alpha + 6\alpha + 7\alpha = 180°;$

$18\alpha = 180°;\ \ \alpha = 180° : 18;\ \ \alpha = 10°;$

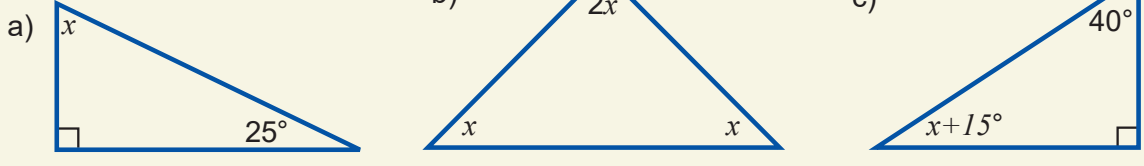
$x = 5\alpha = 5 \cdot 10° = 50°;\ \ y = 6\alpha = 6 \cdot 10° = 60°;$

$z = 7\alpha = 7 \cdot 10° = 70°.$

Javob: $50°,\ \ 60°,\ \ 70°.$

5. 11-rasmdagi noma'lum burchaklarni toping.

11



a) $x + 25° = 90°;\ \ \ x = 90° - 25° = 65°.$ **Javob:** $x = 65°.$

b) $x + x + 2x = 180°;\ \ \ 4x = 180°;\ \ \ x = 45°;\ \ \ 2x = 2 \cdot 45° = 90°.$

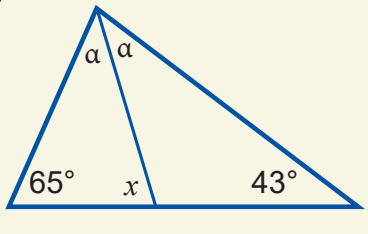
Javob: $x=45°,\ \ x = 45°,\ \ 2x = 90°.$

c) $x + 15° + 40° = 90°;\ \ x = 90°\text{-}55° = 35°;\ \ x + 15° = 35° + 15° = 50°.$

Javob: $x + 15° = 50°.$

6. 12-rasmdagi noma'lum x burchakni toping.

12



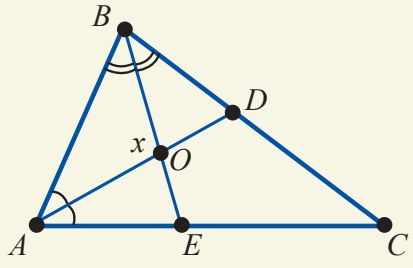
$65° + 43° + 2\alpha = 180°;\ \ 108° + 2\alpha = 180°;$

$2\alpha = 180° - 108°;\ \ 2\alpha = 72°;\ \ \alpha = 36°;$

$\alpha + x + 65° = 180°;\ \ 36° + x + 65° = 180°;$

$x = 180° - 36° - 65° = 180° - 101° = 79°.$

Javob: $x = 79°.$



$\angle BAC = 74°,\ \angle ABC = 76°$

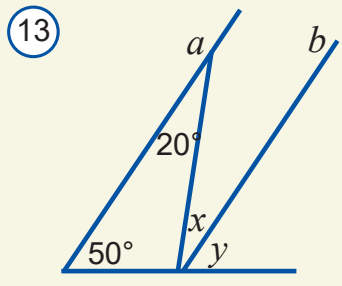
$\begin{cases}\angle BAC = 2\alpha \\ \angle ABC = 2\beta\end{cases} \rightarrow \begin{cases}2\alpha = 74° \\ 2\beta = 76°\end{cases} \rightarrow \begin{cases}\alpha = 37° \\ \beta = 38°\end{cases} \rightarrow$

$\alpha + \beta + x = 180°;$ $\quad 37°+38° + x = 180°;$

$75° + x = 180°;$ $\quad x = 180° - 75° = 105°.$

Javob: $x = 105°.$

7. Rasmda $a \parallel b$. x va y ni toping.



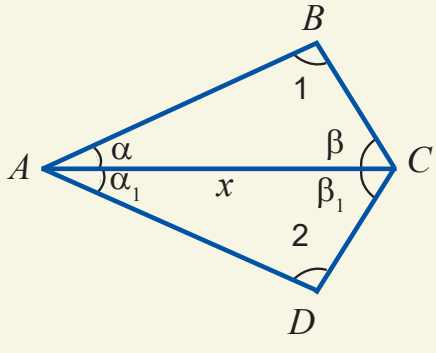
$a \parallel b,\ x = 20°$ ichki almashinuvchi burchaklar.

$x + y = 50° + 20°;\ 20° + y = 70°;$

$y = 70° - 20° = 50°.$

Javob: $x = 20°,\ y = 50°.$

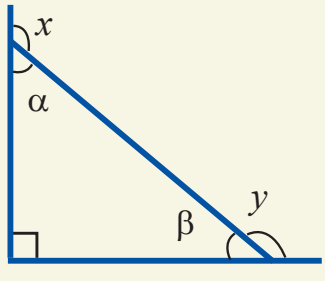
8. Rasmda $\angle 1 = \angle 2$ ekanligini isbotlang.



$\begin{cases}\alpha = \alpha_1 \\ \beta = \beta_1 \\ x - umumiy\end{cases}$ $BTB\ alomatiga\ ko'ra$

$\Delta ABC = \Delta ACD.$ Demak, $\angle 1 = \angle 2.$

9. Rasmda $x + y$ ni toping.



$\alpha + \beta = 90°;$ $\quad \begin{cases}\alpha + x = 180° \\ \beta + y = 180°\end{cases} \rightarrow$

$\alpha + \beta + x + y = 180° + 180°;$

$90° + x + y = 360°;$

$x + y = 360° - 90°;$

$x + y = 270°.$

Javob: $x + y = 270°.$

2-DARS

I. Standartlar:

M7.GO‘.MM.14. Uchburchak ichki burchaklari yig‘indisi haqidagi teoremani va uning natijalarini isbotlay oladi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– uchburchak ichki burchaklari yig‘indisi haqidagi teoremani bilish;
– uning natijalarini isbotlay olish.

Ko‘nikmalar:

– uchburchak ichki burchaklari yig‘indisi haqidagi teoremani va uning natijalarini isbotlay oladi.

III. Dars mazmunining qisqacha tavsifi:

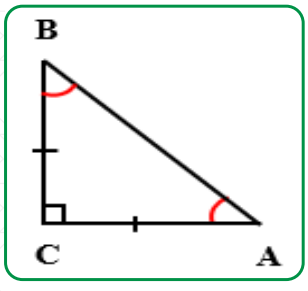
– uchburchak ichki burchaklarining yig‘indisi haqidagi teorema.

IV. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Uchburchak tashqi va ichki burchagi haqida nima deya olasiz?	“Aqliy hujum”	Uchburchakning nechta burchagi o‘tmas bo‘lishi mumkin?
Bilimlarni boyitish va mustahkamlash	Uchburchakning hamma ichki va tashqi burchaklarini o‘lchash	Darslikning 126-sahifasidagi geometrik tadqiqot bilan ishlash	1. Burchaklari: a) 5°, 55°, 120°; b) 46°, 150°,4°; c) 100°, 20°, 50°; d) 25°, 35°, 100° bo‘lgan uchburchak mavjudmi? 2. Amaliy mashq va tatbiq (12, 13)
Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikdagi 14-, 15-, 16-amaliy mashqlarni bajarish
Uyga vazifa	1.Darslikdagi 5-6-savolga javob berish; 2. Darslikdagi 17-18-amaliy mashqlarni yechish.		

Masalalar, yechimlari va ularga doir ko‘rsatmalar

1. Teng yonli to‘g‘ri burchakli uchburchak burchaklarini toping.



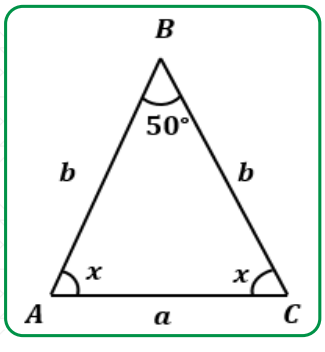
Berilgan: $AC=BC;\ \angle C = 90°.\quad \angle A = ?,\quad \angle B = ?$

$AC = BC$ bo‘lgani uchun, $\angle A = \angle B$ bo‘ladi .

$\angle A + \angle B + \angle C = 180°;\ \ \angle A + \angle A + 90° = 180°;$

$2 \cdot \angle A = 180° - 90°;\quad 2 \cdot \angle A = 90°;\quad \angle A = \frac{90°}{2}$.

2. Agar teng yonli uchburchak burchaklaridan biri a) $50°$; b) $60°$; c) $105°$ bo‘lsa, uning burchaklarini toping.



Berilgan: $AB = BC;\quad \angle B = 50°.$ Topish kerak: $\angle A,\ \angle B.$

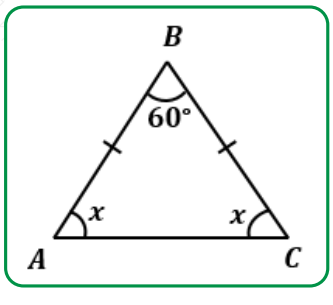
$AB = BC$ bo‘lgani uchun $\angle A = \angle C.$

$\angle A + \angle B + \angle C = 180°;\quad \angle A + 50° + \angle A = 180°;$

$2 \cdot \angle A = 180° - 50°;\quad 2 \cdot \angle A = 130°;\quad \angle A = 65°;$

$\angle C = \angle A = 65°.$

Javob: $65°;\ 65°.$



Berilgan: $AB = BC;\quad \angle B = 60°.$ Topish kerak: $\angle A,\ \angle B.$

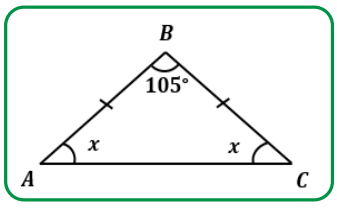
$AB = BC$ bo‘lgani uchun $\angle A = \angle C.$

$\angle A + \angle B + \angle C = 180°;\quad \angle A + 60° + \angle A = 180°;$

$2 \cdot \angle A = 180° - 60°;\quad 2 \cdot \angle A = 120°;\quad \angle A = 60°;$

$\angle C = \angle A = 60°.$

Javob: $60°;\ 60°.$



Berilgan: $AB = BC;\quad \angle B=105°.$ Topish kerak: $\angle A,\ \angle B.$

$AB=BC$ bo‘lgani uchun $\angle A = \angle C.$

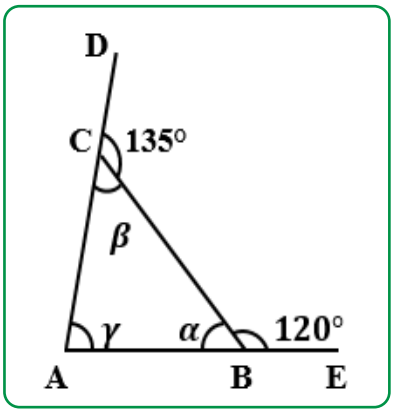
$\angle A + \angle B + \angle C = 180°;\quad \angle A + 105° + \angle A = 180°;$

$2 \cdot \angle A = 180° - 105°;\quad 2 \cdot \angle A = 75°;\quad \angle A = 37,5°;$

$\angle C = \angle A = 37,5°.$

Javob: $37,5°;\ 37,5°.$

3. Uchburchakning ikki tashqi burchagi $120°$ va $135°$ bo‘lsa, ichki burchaklarini toping.



Berilgan: $\angle CBE = 120°;\quad \angle BCD = 135°.$

Topish kerak: $\alpha = ?,\quad \beta = ?,\ \gamma = ?$

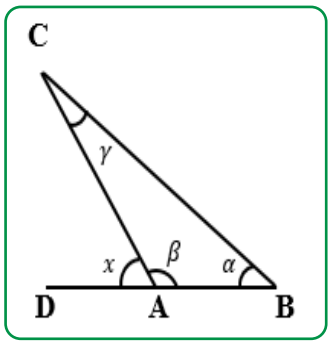
$\angle ABC + \angle CBE = 180°;\quad \alpha + 120° = 180°;$

$\alpha = 180°\text{-}120° = 60°;\quad \angle ABC = \alpha = 60°;$

$\angle ACB + \angle BCD = 180°;\quad \beta + 135° = 180°;$

$\beta = 180° - 135° = 45°;\quad \angle ACB = \beta = 45°.$

15. Uchburchakning ichki burchaklaridan biri $30°$ ga, tashqi burchaklaridan biri $60°$ ga teng. Uchburchakning qolgan ichki burchaklarini toping.



Berilgan: $\alpha = 30°;\quad x = 60°.$ Topish kerak: $\beta = ?,\ \gamma = ?$

$\angle DAC + \angle BAC = 180°;\quad x + \beta = 180°;$

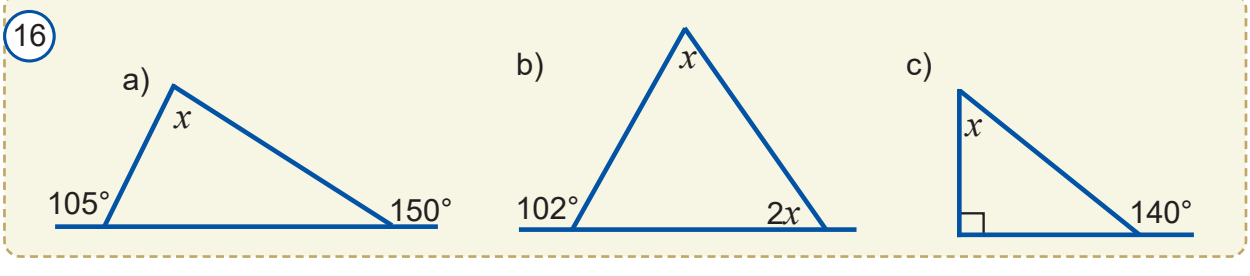
$60° + \beta = 180°;\quad \beta = 180° - 60° = 120°;$

$\alpha + \beta + \gamma = 180°;\quad 30° + 120° + \gamma = 180°;$

$\gamma = 180° - 30° - 120° = 30°.$

Javob: $\beta = 120°;\quad \gamma = 30°$

16. 16-rasmlardagi noma'lum burchakni toping.



a) Berilgan: $\alpha = 105°;\ \beta = 150°.$ Topish kerak: $x = ?$

$\alpha + y = 180°;\quad y = 180° - \alpha = 180° - 105° = 75°;\quad \beta + z = 180°;$

$z = 180° - \beta = 180° - 150° = 30°;\quad x + y + z = 180°;$

$x + 75° + 30° = 180°;\quad x + 105° = 180°;\quad x = 180° - 105° = 75°.$

Javob: $x = 75°.$

b) Berilgan: $\alpha = 102°.$ Topish kerak: $x = ?;\ 2x = ?$

$\alpha + y = 180°;\quad y = 180° - \alpha = 180° - 102° = 78°;\quad x + y + 2x = 180°;$

$x + 78° + 2x = 180°;\quad 3x + 78° = 180°;\quad 3x = 180° - 78°;\quad 3x = 102°;$

$x = \frac{102°}{3};\quad x = 34°;\quad 2x = 2 \cdot 34° = 68°.$

Javob: $x = 34°;\quad 2x = 68°.$

c) Berilgan: $\alpha = 140°;\quad y = 90°.$ Topish kerak: $x=?$

$\alpha + z = 180°;\quad 140° + z = 180°;\quad z = 180° - 140° = 40°;$

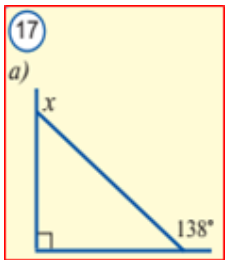
$x + y + z = 180°;\quad x + 90° + 40°=180°;\quad x + 130° = 180°;$

$x = 180° - 130° = 50°.$

Javob: $x = 50°.$

Uyga vazifa

17. 17-rasmlardagi noma'lum burchakni toping.



Berilgan: $y = 138°;\ \gamma = 90°.$ Topish kerak: $x = ?$

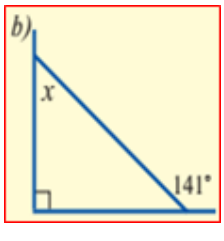
$\beta + y = 180°;\quad \beta + 138° = 180°;\quad \beta = 180° - 138°;$

$\beta = 42°;\ \alpha + \beta + \gamma = 180°;\quad \alpha + 138° + 90° = 180°;$

$\alpha + 128° = 180°;\quad \alpha = 180° - 128° = 52°;$

$\alpha + x = 180°;\quad 52° + x = 180°;\ x = 180° - 52° = 128°.$

Javob: $x = 128°.$



Berilgan: $\alpha = 141°;\ z = 90°.$ Topish kerak: $x = ?$

$y + \alpha = 180°;\quad y + 141° = 180°;\quad y = 180° - 141°;$

$y = 39°;\quad x + y + z = 180°;\quad x + 39° + 90° = 180°;$

$x + 129° = 180°;\quad x = 180° - 129° = 51°;$

Javob: $x = 51°.$

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3-DARS

I. Standartlar:

M7.GO‘.MM.15. Uchburchak ichki va tashqi burchagi haqidagi teoremalardan masalalar yechishda foydalana oladi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– uchburchak ichki va tashqi burchagi haqidagi teoremalarni bilish;
– teoremalardan masalalar yechishda foydalana olish.

Ko‘nikmalar:

– uchburchak ichki va tashqi burchagi haqidagi teoremalardan masalalar yechishda foydalana oladi.

III. Dars mazmunining qisqacha tavsifi:

– uchburchakning tashqi burchagi va uning xossasi.

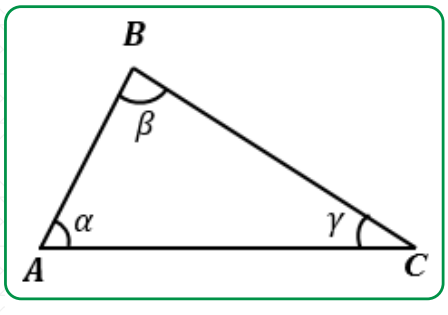
IV.Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Uchburchak tashqi burchagining gradus o‘lchovlari haqida nima deya olasiz?	“Aqliy hujum”	Uchburchakning o‘tmas tashqi burchaklari: a) 1 ta; b) 2 ta; c) 3 ta bo‘lishi mumkinmi?
Bilimlarni boyitish va mustahkamlash	Uchburchak tashqi burchagi haqidagi teorema	Darslikning 126-sahifasidagi teorema bilan ishlash	1. Uchburchakning bir uchidagi ichki va tashqi burchaklari teng bo‘lishi mumkinmi? 2. Amaliy mashq va tatbiq (19, 20).
	“Tangram” nomli xitoy o‘yinchog‘i haqida	Darslikning 130-sahifasidagi geometrik boshqotirma bilan ishlash	1. 27-rasmdagi shakllarni yasash; 2. Amaliy mashq va tatbiq (21, 22, 23).

Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikdagi 24-, 25-, 26-amaliy mashqlarni bajarish;
Uyga vazifa	1. Darslikdagi 9-savolga javob berish. 2. Darslikdagi 27-, 28-, 29-amaliy mashqlarni yechish.		

Masalalar, yechimlari va ularga doir ko‘rsatmalar

1. Uchburchak ikkita ichki burchagining o‘lchovlari nisbati 5:9 kabi, uchinchi ichki burchagi shu burchaklarning kichigidan 10° ga kichik. Uchburchakning ichki burchaklarini toping.



Berilgan: $\alpha = 5x;\quad \beta = 9x;\ \gamma = \alpha - 10°.$

Topish kerak: $\alpha = ?,\ \beta = ?,\ \gamma = ?$

$\gamma = \alpha - 10° = 5x - 10°;\ \alpha + \beta + \gamma = 180°;$

$5x + 9x + 5x - 10° = 180°;\ 19x - 10° = 180°;$

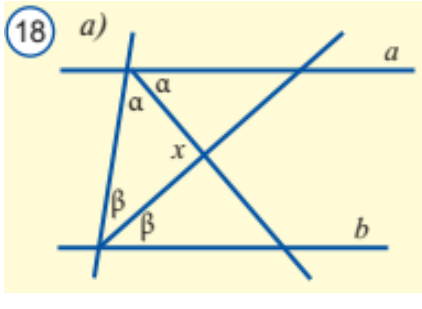
$19x = 180° + 10°;\ 19x = 190°;\ x = 10°;$

$\alpha = 5x = 5 \cdot 10° = 50°;\ \beta = 9x = 9 \cdot 10° = 90°;$

$\gamma = \alpha - 10° = 50° - 10° = 40°.$

Javob: $\alpha = 50°,\ \beta = 90°,\ \gamma = 40°.$

2. Agar 18-rasmlarda $a \parallel b$ bo‘lsa, x ni toping.



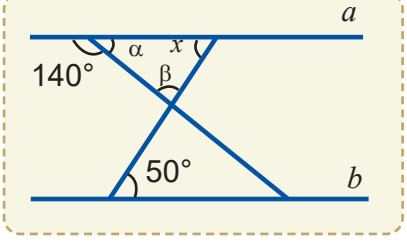
a) $a \parallel b$ bo‘lsa, $\alpha + \alpha + \beta + \beta = 180°;$

$2\alpha + 2\beta = 180°;\quad 2(\alpha+\beta) = 180°;$

$\alpha + \beta = \frac{180°}{2};\quad \alpha + \beta = 90°;\quad \alpha + \beta + x = 180°;$

$90° + x = 180°;\ x = 180° - 90° = 90°.$

Javob: $x = 90°.$



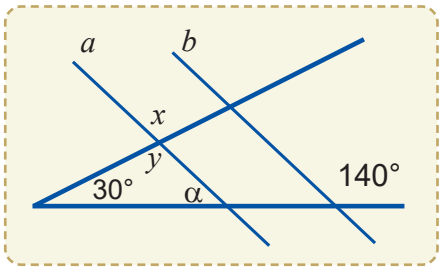
b) $a \parallel b$ bo‘lsa, $x = ?\ \ 140° + \alpha = 180°;$

$\alpha = 180° - 140° = 40°;\ \beta = 140° - 50° = 90°;$

$x = 180° - (\alpha+\beta) = 180° - (40° + 90°) =$

$= 180° - 130° = 50°.$

Javob: $x = 50°.$

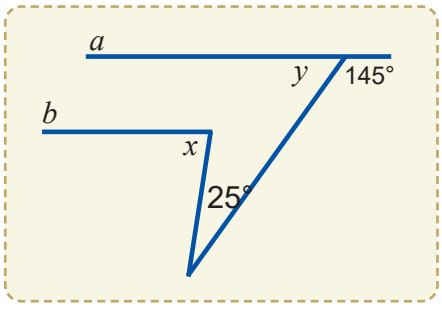


c) $a \parallel b$ bo‘lsa, $x = ?$ $\alpha = 180° - 140° = 40°;$

$y = 180° - (30° + \alpha) = 180° - (30° + 40°) =$

$= 180° - 70° = 110°.$ $x = y = 110°$ vertikal

Javob: $x = 110°.$



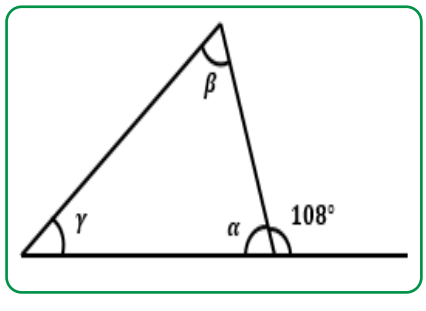
d) $a \parallel b$ bo‘lsa, $x = ?$ $y = 180° - 145° = 35°;$

Tashqi burchak o‘ziga qo‘shni bo‘lmagan burchaklar yig‘indisiga teng.

$x = y + 25° = 35° + 25° = 60°$

Javob: $x = 60°.$

3. Uchburchakning $108°$ li tashqi burchagiga qo‘shni bo‘lmagan ichki burchaklarining nisbati 5:4 kabi. Shu ichki burchaklarini toping.



Berilgan: $\varphi = 108°;$ $\beta : \gamma = 5 : 4.$ $\beta = ?,$ $\gamma = ?$

$\alpha + 108° = 180°;$ $\alpha = 180° - 108° = 72°;$

$\beta = 5x;$ $\gamma = 4x;$ $\alpha + \beta + \gamma = 180°;$

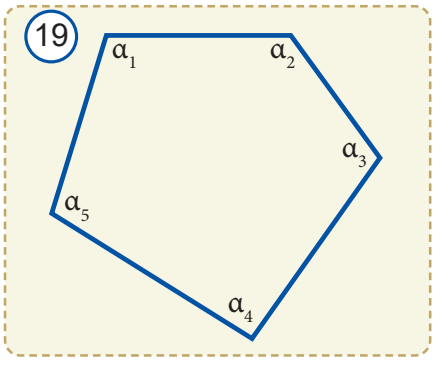
$72° + 5x + 4x = 180°;$ $9x = 180° - 72°;$

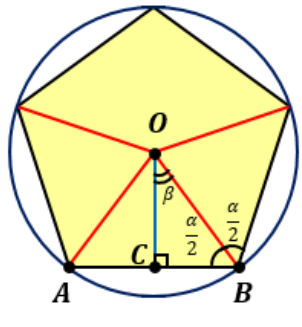
$9x = 108°;$ $x = 12°;$ $\beta = 5x = 5 \cdot 12° = 60°;$

$\gamma = 4x = 4 \cdot 12° = 48°.$

Javob: $\beta = 60°;$ $\gamma = 48°.$

4*. 19-rasmda tasvirlangan beshburchak burchaklari yig‘indisini toping.





$\angle B = \angle a_1 = \angle a_2 = \angle a_3 = \angle a_4 = \angle a_5;$ $n = 5;$

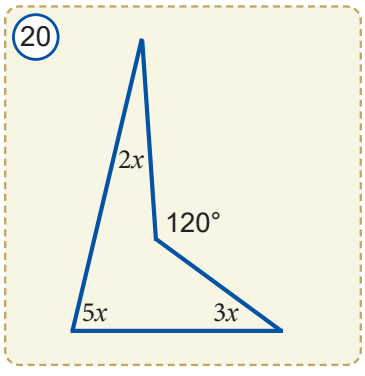
$\beta = \frac{180°}{n} = \frac{180°}{5} = 36°;$ $\frac{\alpha}{2} = 90° - \beta = 90° - 36° = 54°;$

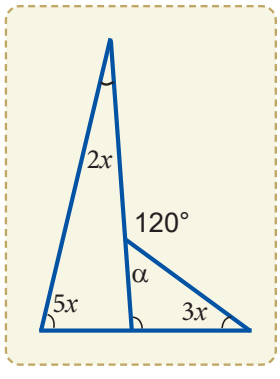
$$\angle B = \frac{\alpha}{2} + \frac{\alpha}{2} = 54° + 54° = 108°; \qquad S = 5 \cdot \angle B = 5 \cdot 108° = 540°.$$

Javob: Beshburchak burchaklari yig‘indisi 540^o ga teng.

5. 20-rasmdagi noma’lum burchaklarni toping.

20





$\alpha = 2x+5x = 7x;\ \alpha + 3x = 120°;$

$7x + 3x = 120°;\ 10x = 120°;$

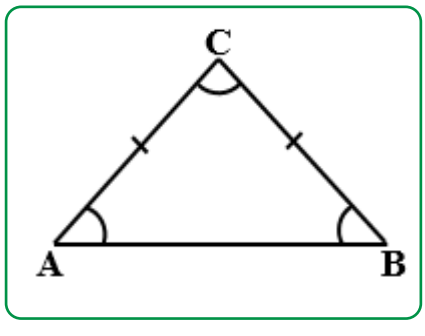
$x = 12°;\ 2x = 2 \cdot 12° = 24°;$

$3x = 3 \cdot 12° = 36°;$

$5x = 5 \cdot 12° = 60°.$

Javob: $24°;\ 36°;\ 60°.$

6. Ikkita burchagi teng bo‘lgan uchburchakni teng yonli ekanligini ko‘rsating.



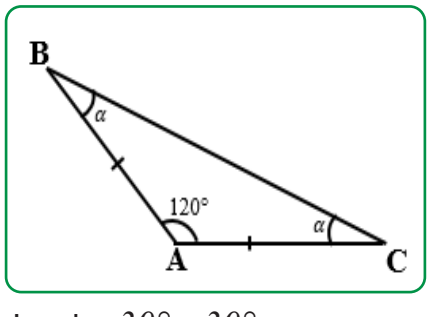
Teng yonli uchburchakning birinchi alomati: uchburchakning ikkita burchagi teng bo‘lsa, bu uchburchak teng yonli bo‘ladi. ACB uchburchakda $\angle A = \angle B$ bo‘lsin.

Uchburchaklar tengligining ikkinchi alomatiga ko‘ra, ABC uchburchak BAC uchburchakka teng.

Haqiqatan, $AB = BA,\ \angle B = \angle A,\ \angle A = \angle B.$

Uchburchaklar tengligidan: $AC = BC.$ Demak, ta’rifga ko‘ra, ABC uchburchak teng yonli.

7. Teng yonli uchburchakning bir burchagi: a) $120°$; b) $70°$. Uning qolgan burchaklarini toping.



a) Berilgan: $AB = AC;\ \angle A = 120°;$

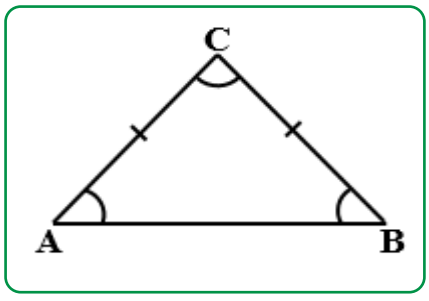
Topish kerak: $\alpha = \angle B = ?,\ \alpha = \angle C = ?$

$\angle A + \angle B + \angle C = 180°;\ \alpha + \alpha + 120° = 180°;$

$2\alpha = 180° - 120°;\ 2\alpha = 60°;\ \alpha = 30°;$

$\angle B = 30°;\ \angle C = 30°.$

Javob: $30°;\ 30°.$



b) Berilgan: $AC = BC;\ \angle C = 70°;$

Topish kerak: $\angle A = ?,\ \angle B = ?\ \angle A = \angle B;$

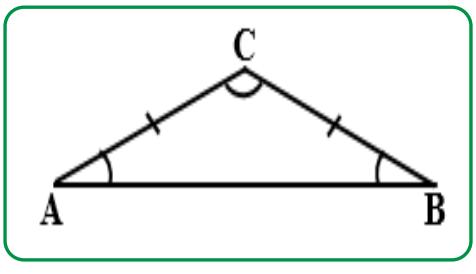
$\angle A + \angle B + \angle C = 180°;\ \angle A + \angle A + 70° = 180°;$

$2\angle A = 180° - 70°;\quad 2\angle A = 110°;\ \angle A = 55°;$

$\angle B = 55°.$

Javob: $55°;\ 55°.$

8. Teng yonli uchburchakning asosidagi burchaklaridan biri a) $15°$; b) $75°$ bo‘lsa, qolgan burchaklari nimaga teng?



a) Berilgan: $AC = BC;\ \angle A = 15°.\ \angle B = ?,$

$\angle C = ?$

$AB = BC$ bo‘lgani uchun $\angle A = \angle B = 15°;$

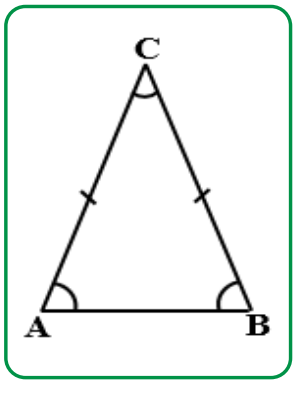
$\angle A + \angle B + \angle C = 180°;$

$15° + 15° + \angle C = 180°;$

$30°+\angle C=180°;$

$\angle C = 180° - 30° = 150°.$

Javob: $\angle B = 15°;\ \angle C = 150°.$



b) Berilgan: $AC = BC;\ \angle A = 75°.\ \angle B = ?,\ \angle C = ?$

$AB = BC$ bo‘lgani uchun $\angle A = \angle B = 75°;$

$\angle A + \angle B + \angle C = 180°;\ 75° + 75° + \angle C = 180°;$

$150° + \angle C = 180°;\ \angle C = 180° - 150° = 30°.$

Javob: $\angle B = 75°;\ \angle C = 30°.$

TO‘G‘RI BURCHAKLI UCHBURCHAKLAR. (2 soat)

1-DARS

I. Standartlar:

M7.GO‘.MM.16. To‘g‘ri burchakli uchburchak elementlari va xossalarini biladi hamda ulardan tegishli vaziyatlarda foydalana oladi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– to‘g‘ri burchakli uchburchak elementlarini bilish;
– uning xossalarini bilish va ulardan tegishli vaziyatlarda foydalana olish.

Ko‘nikmalar:

– to‘g‘ri burchakli uchburchak elementlari va uning xossalarini biladi;
– ulardan tegishli vaziyatlarda foydalana oladi.

III. Dars mazmunining qisqacha tavsifi:

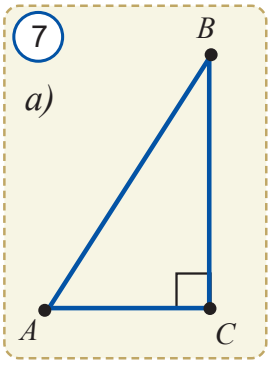
– to‘g‘ri burchakli uchburchak elementlari va uning xossalari;

IV. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Qanday uchburchakka to‘g‘ri burchakli uchburchak deyiladi?	“Aqliy hujum”	To‘g‘ri burchakli uchburchakning tomonlari qanday nomlanadi?
Bilimlarni boyitish va mustahkamlash	To‘g‘ri burchakli uchburchakning xossalari	Darslikning 131-sahifasidagi xossalar bilan ishlash	Amaliy mashq va tatbiq (1, 2)
	Xossalarni qo‘llash	Darslikning 134-sahifasidagi 8-, 9-rasmlar bilan ishlash	Amaliy mashq va tatbiq (6, 7)
Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikdagi 3-, 4-amaliy mashqlarni bajarish
Uyga vazifa	1. Darslikdagi 6-savolga javob berish. 2. Darslikdagi 5-amaliy mashqni yechish.		

Masalalar, yechimlari va ularga doir ko‘rsatmalar

1. 11.*a*-rasmdagi ACB to‘g‘ri burchakli uchburchakning gipotenuzasi va katetlarini yozing. Bu uchburchakning qaysi tomoni uzun: a) AB yoki BC; b) AB yoki AC?



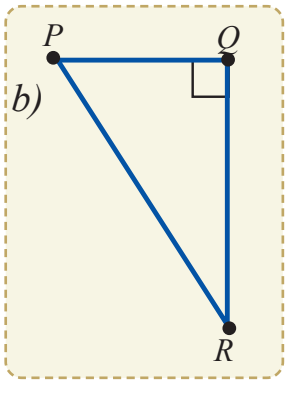
ACB to‘g‘ri burchakli uchburchakning gipotenuzasi – AB,

katetlari – BC va AC.

a) Bu uchburchakning AB tomoni uzun.

b) Bu uchburchakning AB tomoni uzun.

2. 11.*b*-rasmdagi PQR to‘g‘ri burchakli uchburchakning gipotenuzasi va katetlarini yozing. Bu uchburchakning qaysi tomoni uzun: a) PR yoki PQ; b) PR yoki QR?



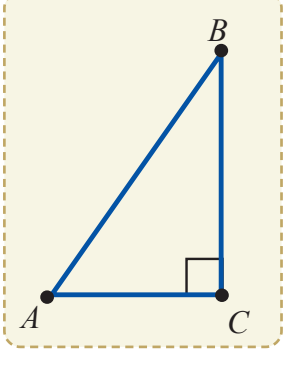
PQR to‘g‘ri burchakli uchburchakning gipotenuzasi – PR,

katetlari – PQ va QR.

a) Bu uchburchakning PR tomoni uzun.

b) Bu uchburchakning PR tomoni uzun.

3. To‘g‘ri burchakli uchburchakning bitta o‘tkir burchagi $23°$ ga teng. Bu uchburchakning uchinchi burchagini toping



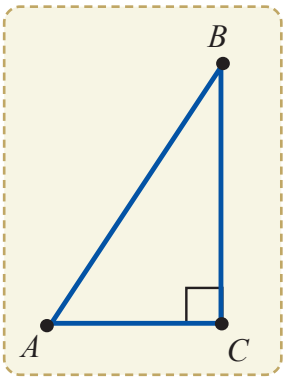
$\angle B = 23°;\ \angle C = 90°.\ \angle A + \angle B + \angle C = 180°;$

$\angle A + 23° + 90° = 180°;\ \angle A + 113° = 180°;$

$\angle A = 180° - 113° = 67°.$

Javob: $\angle A = 67°.$

4. To‘g‘ri burchakli uchburchakning bitta burchagi a) $78°$; b) $43°$. Uchburchakning uchinchi burchagini toping.



a) $\angle A = 78°$; $\angle C = 90°$. $\angle A + \angle B + \angle C = 180°$;

$78° + \angle B + 90° = 180°$; $\angle B + 168° = 180°$;

$\angle B = 180° - 168° = 12°$.

Javob: $12°$.

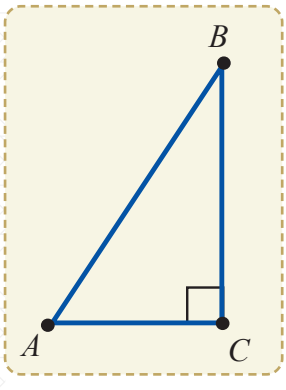
b) $\angle B = 43°$; $\angle C = 90°$. $\angle A+\angle B+\angle C = 180°$;

$\angle A + 43° + 90° = 180°$; $\angle A + 133° = 180°$;

$\angle A = 180° - 133° = 47°$.

Javob: $47°$.

5. To‘g‘ri burchakli uchburchakning gipotenuzasi 14 ga, katetlaridan biri 7 ga teng. Bu uchburchakning burchaklarini toping.



$AB = 14$; $AC = 7$; $\angle C = 90^o$. $\angle A = ?$ $\angle B = ?$

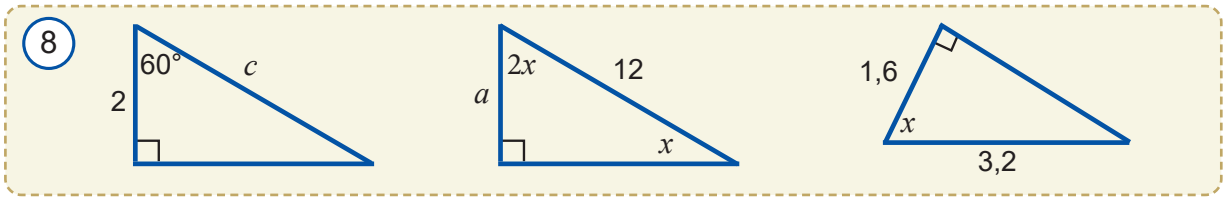
19-paragrafdagi 3-xossaga asosan:

$$\frac{AB}{AC} = \frac{14}{7} = 2.$$

Demak, $\angle A = 30^o$; $\angle B = 180^o - 30^o - 90^o = 60^o$

Javob: $\angle A = 30^o$; $\angle B = 60^o$.

6. 11-rasm: a) $c = ?$ b) $a = ?$ c) $x = ?$



1) Berilgan: $a = 2$; $\alpha = 60°$; $\gamma = 90°$.

Topish kerak: $c = ?$ $\beta = \gamma - \alpha = 90° - 60° = 30°$;

19-paragrafdagi 2-xossaga asosan:

$\frac{c}{2} = 2$; $c = 4$.

Javob: $c = 4$.

2) Berilgan: $c = 12$; $\gamma = 90°$; $\alpha = 2x$; $\beta = x$.

Topish kerak: $a = ?$

$\alpha + \beta + \gamma = 180°;\quad 2x + x + 90° = 180°;\quad 3x + 90° = 180°;$

$3x = 180° - 90°;\quad 3x = 90°;\quad x = \frac{90°}{3};\quad x = 30°;\quad \beta = x = 30°;$

$\alpha = 2x = 2 \cdot 30° = 60°.$

19 paragrafdagi 2-xossaga asosan:

$$a = \frac{c}{2} = \frac{12}{2} = 6.$$

Javob: $a = 6.$

3) Berilgan: $a = 1{,}6;\quad c = 3{,}2;\quad \gamma = 90°.$ Topish kerak: $x = ?$

19 paragrafdagi 3-xossaga asosan $\beta = 30°$ ga teng, chunki $\frac{c}{a} = 2;$

$x = 180° - 90° - 30° = 60°.$

Javob: $x = 60°.$

2-DARS

I. Standartlar:

M7.GO‘.MM.17. To‘g‘ri burchakli uchburchaklarning tenglik alomatlari haqidagi teoremalarni biladi va ulardan masalalar yechishda foydalana oladi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

— to‘g‘ri burchakli uchburchaklarning tenglik alomatlari haqidagi teoremalarni bilish;
— ulardan masalalar yechishda foydalana olish;

Ko‘nikmalar:

— to‘g‘ri burchakli uchburchaklarning tenglik alomatlari haqidagi teoremalarni biladi;
— ulardan masalalar yechishda foydalana oladi.

III. Dars mazmunining qisqacha tavsifi:

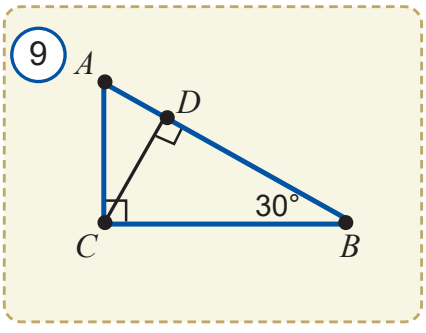
— to‘g‘ri burchakli uchburchaklarning tenglik alomatlari haqidagi teoremalar.

IV. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	To‘g‘ri burchakli uchburchakning tomonlari qanday nomlanadi?	“Aqliy hujum”	To‘g‘ri burchakli uchburchaklarning xossalarini ayting va izohlang.
Bilimlarni boyitish va mustahkamlash	To‘g‘ri burchakli uchburchaklarning tenglik alomatlari	Darslikning 132-sahifasidagi teoremalar bilan ishlash	1. To‘g‘ri burchakli uchburchaklar tengligining alomatlarini ayting va izohlang. 2. Amaliy mashq va tatbiq.
	Teoremalarni qo‘llash	Darslikning 134-sahifasidagi 11-rasm bilan ishlash	Amaliy mashq va tatbiq (10)
Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikdagi 8-, 9-amaliy mashqlarni bajarish
Uyga vazifa	1. Darslikdagi 10-savolga javob berish. 2. Darslikdagi 11-amaliy mashqni yechish.		

Masalalar, yechimlari va ularga doir ko‘rsatmalar

1. 9-rasm: a) $AB = 20,\ AD = ?$ b) $AB = 18,\ BD = ?$ c) $BD = ?$



a) Berilgan: $AB=20,\ \angle B = 30°;\ \angle C = 90°;$ $\angle D = 90°$. Topish kerak: $AD = ?$

$\angle DCB = \angle D - \angle B = 90° - 30° = 60°;$

ΔACB da 19-paragraf 2-xossaga asosan:

$$AC = \frac{AB}{2} = \frac{20}{2} = 10$$

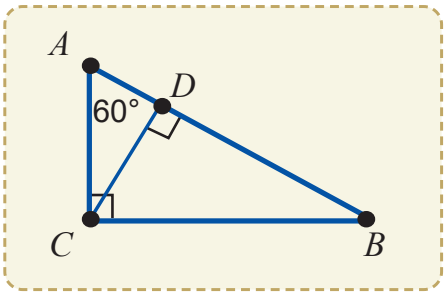
ΔACD da AC gipotenuza $\angle C = 30^o;$

19-paragraf 2-xossaga asosan:

$$AB = \frac{10}{2} = 5.$$

Javob: $AD = 5.$

b) $AB = 18,\ BD = ?$



b) Berilgan: $AB = 18;\ \angle A = 60°;\ \angle C = 90°;$ $\angle D = 90°$. Topish kerak: $BD = ?$

$\angle ACD = \angle D - \angle A = 90° - 60° = 30°;$

$\angle BCD = \angle C - \angle ACD = 90° - 30° = 60°;$

$\angle B = \angle D - \angle BCD = 90° - 60° = 30°;$

19-paragraf 2-xossaga asosan:

$$AB = \frac{18}{2} = 9.$$

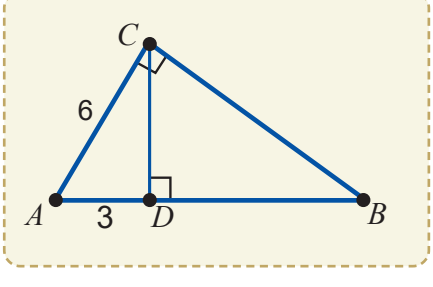
$\angle C = 180° - 90° - 60° = 30°;$

19-paragrafdagi 2-xossaga asosan: $D = \frac{AC}{2} = \frac{9}{2} = 4{,}5;$

$AD + BD = AB;\ BD = 18 - 4{,}5 = 13{,}5.$

Javob: $BD = 13{,}5.$

c) $BD = ?$



c) Berilgan: $AC = 6;\ AD = 3;\ \angle C = 90°;$ $\angle D = 90°$. Topish kerak: $BD = ?$

ΔACD da $\angle D = 90°;\ \angle C = 30°;\ \angle A = 60°;$

19-paragrafdagi 3-xossaga asosan: $AB = \frac{6}{2} = 3;$

ΔBCD da $\angle D = 90°;\ \angle C = 90°\text{-}30° = 60°;$

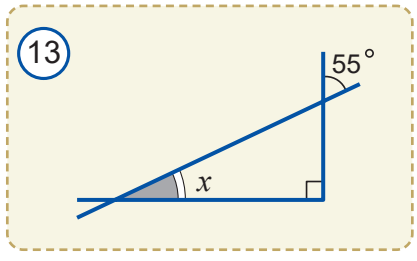
$\angle B = 30°$.

19-paragrafdagi 2-xossaga asosan: $AC = \frac{AD + DB}{2} = \frac{3 + BD}{2} = 6$

$BD = 9$.

Javob: $BD = 9$.

2. 13-rasmdagi noma'lum x burchakni toping.



Berilgan: $\alpha = x;\ y = 55°;\ \gamma = 90°$.

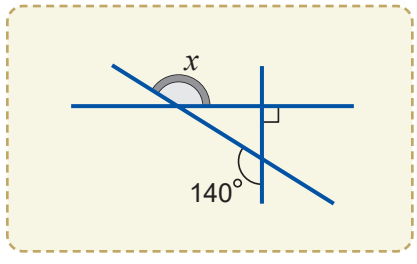
Topish kerak: $x = ?$

$\beta = y = 55°$ vertikal burchak;

$\alpha + \beta + \gamma = 180°;\quad x + 55° + 90° = 180°;$

$x + 145° = 180°;\quad x = 180° - 145° = 35°$.

Javob: $x = 35°$.



1-usul. $\alpha + y = 180°;\quad \alpha + 140° = 180°;$

$\alpha = 180° - 140° = 40°;\qquad \alpha = 40°;$

$\beta = \gamma - \alpha = 90° - 40° = 50°;\qquad \beta = 50°;$

$\beta + x = 180°;\ x = 180° - \beta = 180° - 50° = 130°$.

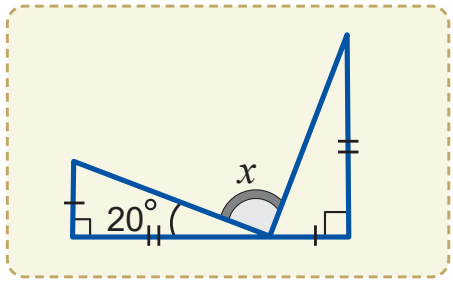
Javob: $x = 130°$.

2-usul. $\alpha + y = 180°;\ \alpha + 140° = 180°;\ \alpha = 180° - 140° = 40°;\ \alpha = 40°$.

Tashqi x burchak o'ziga qo'shni bo'lmagan α va γ ichki burchaklar yig'indisiga teng.

$x = \alpha + \gamma = 40° + 90° = 130°$.

Javob: $x = 130°$.



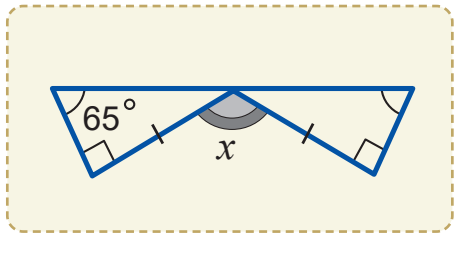
Berilgan: $\alpha = 20°;\ \gamma = 90°$. Topish kerak: $x = ?$

$\beta = 90° - 20° = 70°;\quad \alpha + x + \beta = 180°;$

$x = 180° - (\alpha + \beta) = 180° - (20° + 70°) =$

$= 180° - 90° = 90°$.

Javob: $x = 90°$.



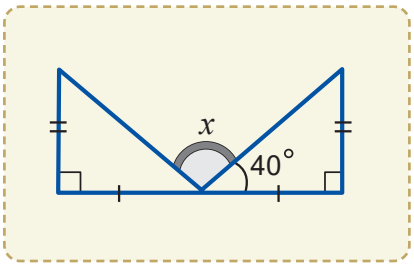
Berilgan: $\alpha = 60°;\quad \gamma = 90°$.

Topish kerak: $x = ?$

$\beta = 90° - 65° = 25°;\ \beta + x + \beta = 180°;$

$x = 180° - 2\beta = 180° - 2 \cdot 25° = 180° - 50° = 130°$.

Javob: $x = 130°$.



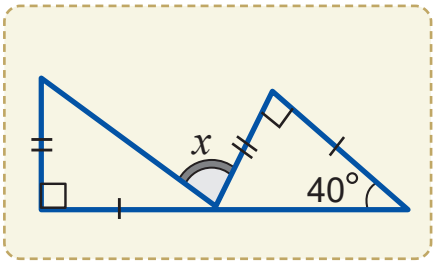
Berilgan: $\alpha = 40°;\ \gamma = 90°$.

Topish kerak: $x = ?$

$\beta = 90° - 40° = 50°;\quad \alpha + x + \alpha = 180°;$

$x = 180° - 2\alpha = 180° - 2 \cdot 40° = 180° - 80° = 100°.$

Javob: $x = 100°.$



Berilgan: $\alpha = 40°;\quad \gamma = 90°.$

Topish kerak: $x = ?$

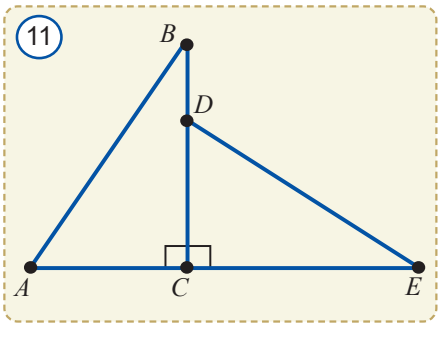
$\beta = 90° - 40° = 50°;\quad \alpha + x + \beta = 180°;$

$40° + x + 50° = 180°;\quad x + 90° = 180°;$

$x = 180° - 90° = 90°.$

Javob: $x = 90°.$

3. Agar 14-rasmda: a) $\angle A = \angle D,\ \angle B = \angle E$; b) $BC = DE,\ AB = CE$; d) $AC = CD,\ BC = CE$; e) $AB = DE$ bo‘lsa, ACB va DCE uchburchaklar teng bo‘ladimi?



a) $\angle A = \angle D;\quad \angle B = \angle E$ bo‘lsa, ACB va DCE uchburchaklar teng bo‘ladimi?

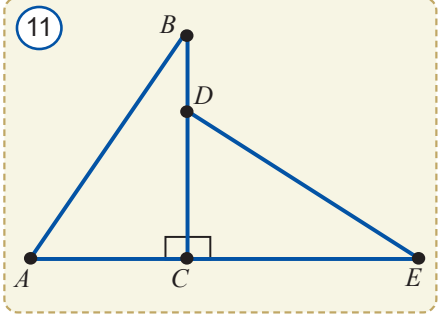
$\angle A = \angle D;\quad \angle B = \angle E.$

To‘g‘ri burchakli uchburchakning burchaklari teng bo‘lsa, o‘xshash bo‘ladi. Qaysidir mos tomonlari teng bo‘lsa, teng bo‘ladi.

Masalada bunday shartlar yo‘q.

Demak, $\Delta ACB \neq \Delta DCE$ ekanligi kelib chiqadi.

Javob: yo‘q.



b) $BC = DE;\quad AB = CE$ bo‘lsa, ACB va DCE uchburchaklar teng bo‘ladimi?

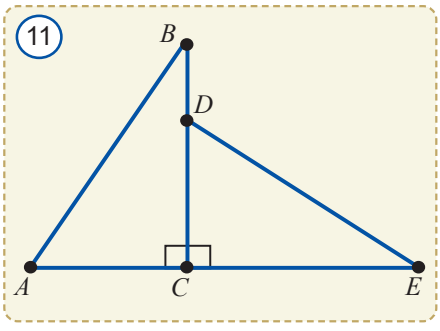
$\begin{cases} BC = DE \\ AB = CE \end{cases} \rightarrow \begin{cases} AB > BC \\ DE > CE \end{cases}$ bo‘lganligi uchun

berilgan ma’lumot bo‘lishi mumkin emas.

Demak, $\Delta ACB \neq \Delta DCE$ ekanligi kelib chiqadi.

Javob: yo‘q.

11



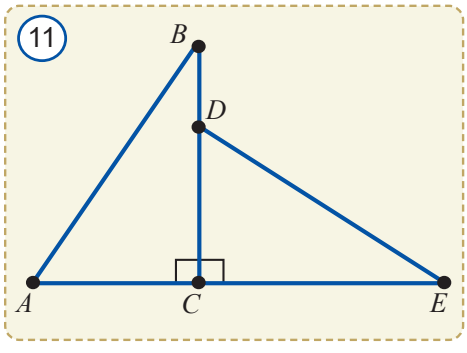
d) $AC = CD;\ AB = CE$ bo‘lsa, ACB va DCE uchburchaklar teng bo‘ladimi?

$$\begin{cases} AC = CD \\ AB = CE \\ \angle ACB = \angle DCE \end{cases}$$ TBT alomatiga ko‘ra

$\Delta ACB = \Delta DCE$ ekanligi kelib chiqadi.

Javob: ha.

11



e) $AB = DE$ bo‘lsa, ACB va DCE uchburchaklar teng bo‘ladimi?

Faqat gipotenuzalari teng bo‘lsa,uchburchaklar teng bo‘lmaydi. Demak, $\Delta ACB \neq \Delta DCE$ ekanligi kelib chiqadi.

Javob: yo‘q.

BURCHAK BISSEKTRISASINING XOSSALARI (2 soat)

1-DARS

I. Standartlar:

M7.GO‘.MM.18. To‘g‘ri burchakli uchburchak gipotenuzasiga tushirilgan medianasining xossasini biladi va masalalar yechishda undan foydalana oladi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– to‘g‘ri burchakli uchburchak gipotenuzasiga tushirilgan medianasi xossasini bilish;
– undan masalalar yechishda foydalana olish.

Ko‘nikmalar:

– to‘g‘ri burchakli uchburchak gipotenuzasiga tushirilgan medianasining xossasini biladi;
– undan masalalar yechishda foydalana oladi.

III. Dars mazmunining qisqacha tavsifi:

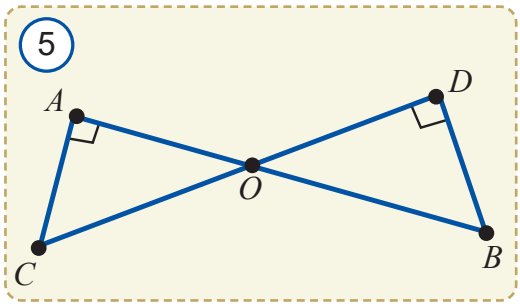
– to‘g‘ri burchakli uchburchak gipotenuzasiga tushirilgan medianasining xossasi.

IV. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Uchburchak elementlarini ayting	“Aqliy hujum”	Uchburchak medianasi nima?
Bilimlarni boyitish va mustahkamlash	To‘g‘ri burchakli uchburchakning gipotenuzasiga tushirilgan mediana haqida teorema	Darslikning 135-sahifasidagi teorema va 1-rasm bilan ishlash	1. To‘g‘ri burchakli uchburchakning gipotenuzaga tushirilgan medianasi gipotenuzaning qanday qismini tashkil qiladi? 2. Amaliy mashq va tatbiq (1, 2)
	Teoremani qo‘llash	Darslikning 135-sahifasidagi 2-rasm bilan ishlash	Amaliy mashq va tatbiq (3, 4)
Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikdagi 11-, 12-amaliy mashqlarni bajarish
Uyga vazifa	1. Teoremani o‘rganib kelish. 2. Darslikdagi 14-amaliy mashqni yechish.		

Masalalar, yechimlari va ularga doir ko‘rsatmalar

1. Agar 5-rasmda: a) $OC = OB$; b) $AC = BD$; d) $AO = OD$; e) $AC = OD$; f) $\angle OCA = \angle OBD$ bo‘lsa, OAC va ODB uchburchaklar teng bo‘ladimi?



a) Berilgan: 5-rasmda $OC = OB$.

Isbotlash kerak: OAC va ODB uchburchaklar teng bo‘ladimi?

$\begin{cases} OC = OB \\ \angle AOC = \angle DOB \\ \angle A = \angle D = 90° \end{cases} \rightarrow \begin{cases} OC = OB \\ \angle AOC = \angle DOB \\ \angle ACO = \angle DBO \end{cases}$ → BTB alomatiga ko‘ra

$\Delta OAC = \Delta ODB$ kelib chiqadi.

Javob: OAC va ODB uchburchaklar teng.

b) Berilgan: 5-rasmda $AC = BD$.

Isbotlash kerak: OAC va ODB uchburchaklar teng bo‘ladimi?

$\angle AOC = \angle DOB \rightarrow \angle ACO = \angle DBO;$ $\begin{cases} AC = BD \\ \angle A = \angle D = 90° \\ \angle ACO = \angle DBO \end{cases}$ BTB alomatiga ko‘ra

$\Delta OAC = \Delta ODB$.

Javob: OAC va ODB uchburchaklar teng.

d) Berilgan: 5-rasmda $AO = OD$.

Isbotlash kerak: OAC va ODB uchburchaklar teng bo‘ladimi?

$\begin{cases} AO = OD \\ \angle D = \angle A = 90° \\ \angle AOC = \angle DOB \end{cases}$ BTB alomatiga ko‘ra $\Delta OAC = \Delta ODB$.

Javob: OAC va ODB uchburchaklar teng.

e) Berilgan: 5-rasmda $AC = OD$.

Isbotlash kerak: OAC va ODB uchburchaklar teng bo‘ladimi?

$AC = OD$ ular mos tomonlar emas. Shuning uchun har doim $\Delta OAC = \Delta ODB$.

Faqat $\angle AOC = \angle DOB = 45°$ bo‘lsa, $\Delta OAC = \Delta ODB$ bo‘ladi.

Javob: OAC va ODB uchburchaklar teng emas.

f) Berilgan: 5-rasmda $\angle OCA = \angle OBD$.

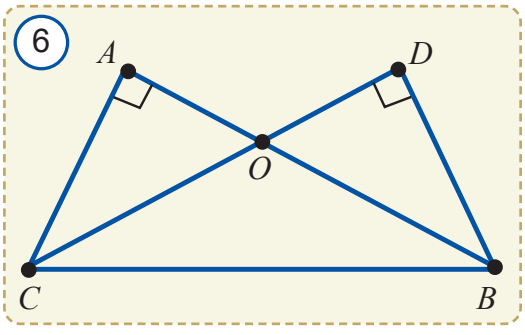
Isbotlash kerak: OAC va ODB uchburchaklar teng bo‘ladimi?

$\begin{cases} \angle OCA = \angle OBD = \alpha \\ \angle COA = \angle BOD = 90° - \alpha \\ \angle A = \angle D = 90° \end{cases}$ uchta burchak teng, shartga ko‘ra o‘xshash.

Javob: OAC va ODB uchburchaklar teng emas.

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2. Agar 6-rasmda: a) $AC = BD$; b) $OA = OD$; d) $\angle OCB = \angle OBC$; e) $BC = OD$; f) $\angle ACB = \angle DBC$ bo‘lsa, BAC va CDB uchburchaklar teng bo‘ladimi?



$\alpha = \angle AOC = \angle BOD;$

$\beta = \angle ACO = \angle DBO = 90° - \alpha$

a) Berilgan: 6-rasmda $AC = BD$.

Isbotlash kerak: BAC va CDB uchburchaklar teng bo‘ladimi?

$\begin{cases} AC = BD \\ \angle A = \angle D = 90° \\ \angle ACO = \angle DBO = \beta \end{cases}$ → BTB alomatiga ko‘ra, $\Delta AOC = \Delta DOB$

bundan esa $\begin{cases} AO = OD \\ CO = OB \end{cases}$ kelib chiqadi. $OC = OB$ bo‘lgani uchun COB uchburchak teng yonli bo‘ladi. $\angle OCB = \angle OBC = \gamma$ bo‘lgani uchun $\begin{cases} \angle ACB = \angle DBC = \beta + \gamma \\ \angle A = \angle D = 90° \\ AC = BD \end{cases}$

BTB alomatiga ko‘ra, $\Delta ABC = \Delta CDB$.

Javob: ABC va CDB uchburchaklar teng.

b) Berilgan: 6-rasmda $AO = OD$.

Isbotlash kerak: BAC va CDB uchburchaklar teng bo‘ladimi?

$\begin{cases} OA = OD \\ \angle A = \angle D = 90° \\ \angle AOC = \angle DOB \end{cases}$ BTB alomatiga ko‘ra, $\Delta AOC = \Delta DOB$. Bundan

$\begin{cases} AC = DB \\ CO = OB \\ \angle ACB = \angle DBC \end{cases}$ kelib chiqadi. $\begin{cases} AC = DB \\ AB = DC \\ BC - umumiy \end{cases}$ TTT alomatiga ko‘ra,

$\Delta ABC = \Delta CDB$ kelib chiqadi.

Javob: ABC va CDB uchburchaklar teng.

d) Berilgan: 6-rasmda $\angle OCB = \angle OBC$.

Isbotlash kerak: BAC va CDB uchburchaklar teng bo‘ladimi?

$\angle OCB = \angle OBC = \gamma$; COB uchburchak teng yonli. $\begin{cases} CO = OB \\ \angle AOC = \angle DOB = \alpha \\ \angle ACO = \angle DBO = \beta \end{cases}$

$\begin{cases} \angle ACB = \angle DBC = \beta + \gamma \\ \angle ABC = \angle DCB = \gamma \\ BC - umumiy \end{cases}$ BTB alomatiga ko‘ra, $\Delta ABC = \Delta CDB$ kelib chiqadi.

Javob: ABC va CDB uchburchaklar teng.

e) Berilgan: 6-rasmda $BC = OD$.

Isbotlash kerak: BAC va CDB uchburchaklar teng bo‘ladimi?

$$\begin{cases} OB > OD \\ BC > OB \end{cases} \rightarrow \quad BC \neq OD, \ \Delta ABC \neq \Delta BDC.$$

Javob: ABC va BDC uchburchaklar teng emas.

f) Berilgan: 6-rasmda $\angle ACB = \angle DBC$.

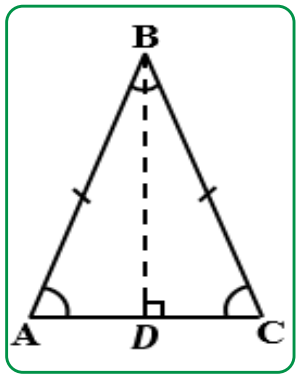
Isbotlash kerak: BAC va CDB uchburchaklar teng bo‘ladimi?

$\angle ACB = \angle DBC = \beta + \gamma;$ $\begin{cases} \angle A = \angle D = 90^\circ \\ \angle ABC = \angle DCB = \gamma \\ BC - umumiy \end{cases}$ BTB alomatiga ko‘ra,

$\Delta ABC = \Delta CDB$ kelib chiqadi.

Javob: ABC va CDB uchburchaklar teng.

3. ABC uchburchakda BD balandlik o‘tkazilgan. Agar $AD = DC$ bo‘lsa, ABC uchburchakning teng yonli ekanligini isbotlang.



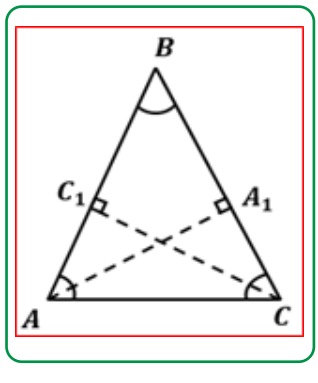
$\begin{cases} AD = DC \\ BD - umumiy \\ \angle ADB = \angle CDB = 90^\circ \end{cases}$ TBT alomatiga ko‘ra,

$\Delta ABD = \Delta CBD$ kelib chiqadi . Demak, $AB = BC$.

Bundan ABC teng yonli uchburchakligi kelib chiqadi.

Javob: ABC teng yonli uchburchak.

4. O‘tkir burchakli ABC uchburchakda AA_1 va CC_1 balandliklar teng. $\angle BAC = \angle BCA$ tenglikni isbotlang.



$\begin{cases} AA_1 = CC_1 = x \\ AC - umumiy \\ AC_1 = CA_1 = \sqrt{(AC)^2 - (AA_1)^2} = \sqrt{AC^2 - x^2} \end{cases}$

TTT alomatiga ko‘ra, $\Delta ACC_1 = \Delta ACA_1$.

Demak, $\angle BAC = \angle BCA$ kelib chiqadi.

Javob: $\angle BAC = \angle BCA$.

2-DARS

I. Standartlar:

M7.GO‘.MM.19. Burchak bissektrisasining xossasini biladi va masalalar yechishda undan foydalana oladi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– burchak bissektrisasining xossasini bilish;
– undan masalalar yechishda foydalana olish.

Ko‘nikmalar:

– burchak bissektrisasining xossasini biladi va undan masalalar yechishda foydalana oladi.

III. Dars mazmunining qisqacha tavsifi:

– burchak bissektrisasining xossasi haqidagi teorema.

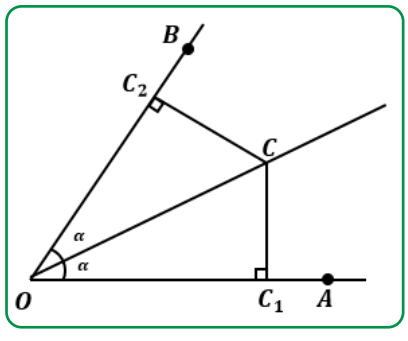
IV. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Uchburchak elementlarini ayting	“Aqliy hujum”	Burchak bissektrisasi nima?
Bilimlarni boyitish va mustahkamlash	Burchak bissektrisasi haqida teorema	Darslikning 135-sahifasidagi teorema va 3-rasm bilan ishlash	1. Burchak bissektrisasining xossasini ayting va sharhlang. 2. Amaliy mashq va tatbiq (5, 6)
	Teoremani qo‘llash	Darslikning 136-sahifasidagi 4-rasm bilan ishlash	Amaliy mashq va tatbiq (7, 8, 9)
Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikdagi 10-, 13-amaliy mashqlarni bajarish

Uyga vazifa	1. Darslikning 137-sahifasidagi geometriyada aniqlik va qisqalikni o‘rganib kelish. 2. Darslikdagi 14-, 15-amaliy mashqlarni yechish.

Masalalar, yechimlari va ularga doir ko‘rsatmalar

1. Burchak bissektrisasining ixtiyoriy nuqtasi uning tomonlaridan teng uzoqlikda joylashganini isbotlang.



OC bissektrisa, $\alpha = \angle BOC = \angle AOC;$

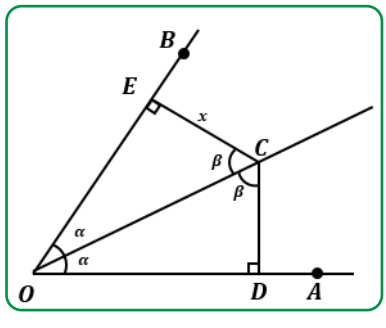
$\angle OC_2C = \angle OC_1C = 90°;\ \angle OCC_2 = \angle OCC_1 = \beta;$

$\beta = 90° - \alpha;$ OC – gipotenuza umumiy.

demak, $\Delta OCC_2 = \Delta OCC_1$ bundan $CC_2 = CC_1$

kelib chiqadi.

2. Burchak AOB bissektrisasida olingan nuqtadan nurgacha bo‘lgan masofa 7 cm bo‘lsa, shu nuqtadan OB nurgacha bo‘lgan masofani toping.



Berilgan: $CD = 7.$ Topish kerak: $CE = x = ?$

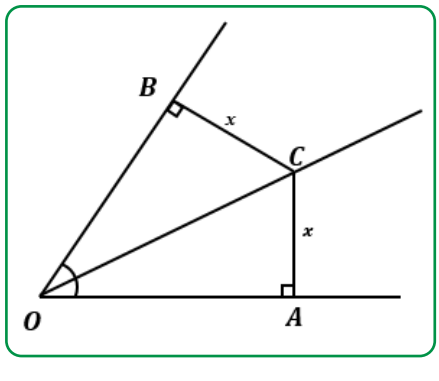
$\angle EOC = \angle DOC = \alpha;\ \angle OCE = \angle OCD = \beta;$

$\angle OEC = \angle ODC = 90°;$ OC-umumiy.

$\Delta OEC = \Delta ODC,\ CD = CE.$

Javob: $x = 7.$

3. O burchak va uning bissektrisasida C nuqta berilgan. Agar $\angle O = 60°$ va $OC = 14$ cm bo‘lsa, C nuqtadan burchak tomonlarigacha bo‘lgan masofani toping.



1-usul.

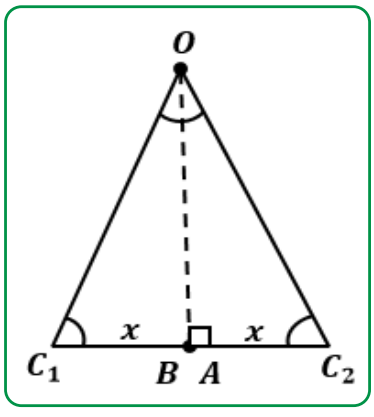
Berilgan: OC bissektrisa,

$\angle O = \angle AOB = 60°;\ OC = 14\ cm.$

Topish kerak: $CA = ?,\ CB = ?$

$\angle AOC = \angle BOC = 30°;\ \Delta OBC = \Delta OAC;$

ΔOBC va ΔOAC larni quyidagicha joylashtiramiz.



C_1 va C_2 $\rightarrow$ C; $BC = AC = x$;

$OC = OC_1 = OC_2 = 14$; $\angle C_1 OC_2 = 60°$;

$C_1 OC_2$ uchburchak teng yonli, $\angle C_1 = \angle C_2 = \alpha$;

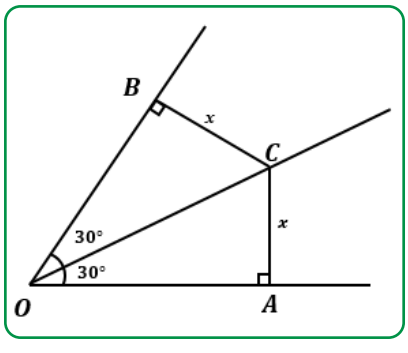
$\angle C_1 + \angle C_2 + \angle C_1 OC_2 = 180°$; $\alpha+\alpha+60° = 180°$;

$2\alpha = 180° - 60°$; $\alpha = \frac{120°}{2}$; $\alpha = 60°$.

$\Delta C_1 OC_2$ da barcha burchak $60°$ bo‘lgani uchun teng tomonli uchburchak, ya’ni muntazam uchburchakdir.

$OC = OC_1 = C_1C_2 = 14$; $C_1C_2 = 2x$; $2x = 14$; $x = 7$.

Javob: $x = 7$.



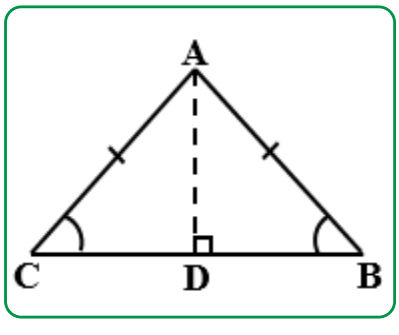
2-usul.

$30°$ qarshisidagi katet gipotenuza yarmiga tengligidan:

$$x = \frac{OC}{2} = \frac{14}{2} = 7.$$

Javob: $x = 7$.

4*. Teng yonli to‘g‘ri burchakli uchburchakning gipotenuzasiga tushirilgan balandlik gipotenuzaning yarmiga tengligini ko‘rsating.



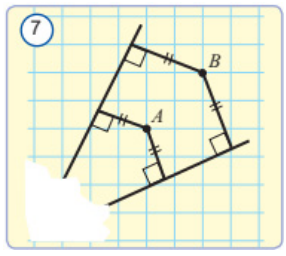
$AC = AB$; $\angle A = 90°$; $\angle B = \angle C = 45°$;

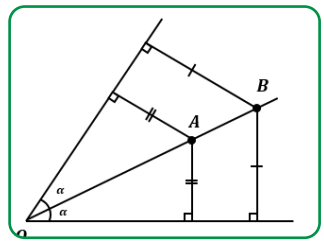
$\angle BAD = \angle CAD = 45°$; $\begin{cases} BD = AD \\ CD = AD \end{cases}$ $\rightarrow$

$\rightarrow BD + CD = AD + AD$; $BC = 2AD$; $AD = \frac{BC}{2}$.

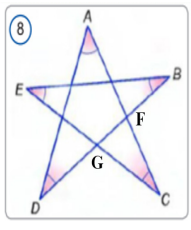
5. AOB burchak ichida N nuqta olingan. Agar $AN = BN$, $OA \perp AN$ va $OB \perp BN$ bo‘lsa, N nuqta AOB burchak bissektrisasida yotishini isbotlang.

6*. 7-rasmda katakli qog‘ozga chizilgan burchakning bir qismi tasvirlangan. Qog‘ozning burchak uchi joylashgan qismi yirtilib ketgan. A va B nuqtalar burchak tomonlaridan teng uzoqlashgani ma’lum. Burchak bissektrisasini qanday yasash mumkin?





7. 8-rasmda tasvirlangan beshburchak burchaklari yig‘indisini toping.



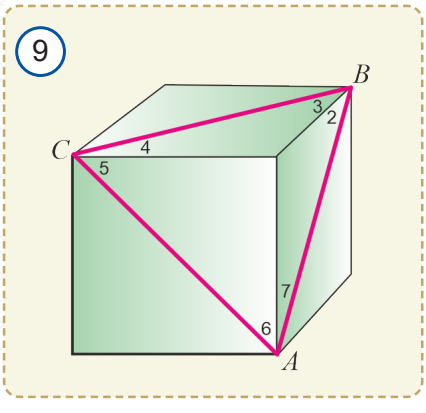
$\angle GFC = \angle A + \angle D;\ \angle FGC = \angle B + \angle E;$

$\angle GFC + \angle FGC + \angle C = 180°;$

$\angle A + \angle D + \angle B + \angle E + \angle C = 180°.$

Javob: $180°$.

8. 9-rasmda tasvirlangan kub sirtida joylashgan uchburchakning raqamlangan burchaklari yig‘indisini toping.

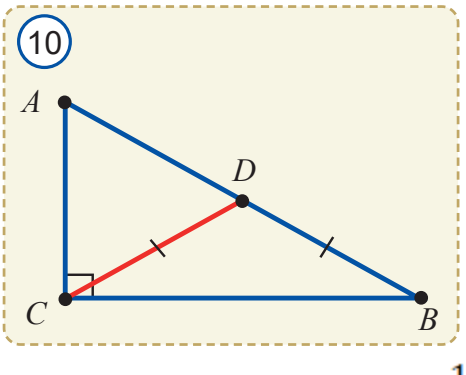


$$+\begin{cases}\angle 1 + \angle 2 = 90° \\ \angle 3 + \angle 4 = 90° \\ \angle 5 + \angle 6 = 90°\end{cases}$$

$\angle 1 + \angle 2 + \angle 3 + \angle 4 + \angle 5 + \angle 6 = 90° + 90° + 90°;$

$\angle 1 + \angle 2 + \angle 3 + \angle 4 + \angle 5 + \angle 6 = 270°.$

9. ABC to‘g‘ri burchakli uchburchakda C to‘g‘ri burchak va $AB = 12$ va $CD = DB$ bo‘lsa, CD ni toping *(10-rasm)*.



Berilgan: $\angle C = 90°;\ AB = 12;\ CD = DB.$

Topish kerak: $CD = ?$

$\angle A = \alpha;\ \angle DBC = \angle DCB = \beta;\ \angle A + \angle B = 90°;$

$\alpha = 90° - \beta;\ \angle ACD = \angle C - \beta = 90° - \beta = \alpha;$

$\angle A = \angle ACD \rightarrow AD = CD;\ AD + CD = 12;$
$CD + CD = 12;$

$2 \cdot CD = 12;\qquad CD = \frac{12}{2};\qquad CD = 6.$

Javob: $CD = 6$.

UCHBURCHAKNING TOMONLARI VA BURCHAKLARI ORASIDAGI MUNOSABATLAR. (3 soat)

1-DARS

I. Standartlar:

M7.GO‘.MM.20. Uchburchakning tomonlari va burchaklari orasidagi munosabatlar haqidagi teoremalarni biladi va masalalar yechishda ulardan foydalana oladi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– uchburchakning tomonlari va burchaklari orasidagi munosabatlar haqidagi teoremalarni bilish;
– teoremalardan masalalar yechishda foydalana olish.

Ko‘nikmalar:

– uchburchakning tomonlari va burchaklari orasidagi munosabatlar haqidagi teoremalarni biladi va masalalar yechishda ulardan foydalana oladi.

III. Dars mazmunining qisqacha tavsifi:

– uchburchakning tomonlari va burchaklari orasidagi munosabatlar haqidagi teoremalar.

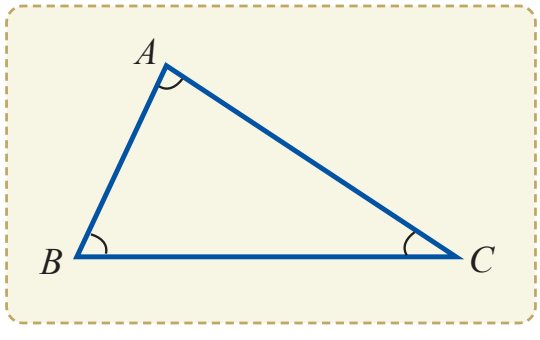
IV. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Uchburchak ichki burchaklari yig‘indisi necha gradusga teng?	“Aqliy hujum”	Uchburchakning katta burchagi 60° dan kichik bo‘lishi mumkinmi? Uchburchakning kichik burchagi 60° dan katta bo‘lishi mumkinmi?
Bilimlarni boyitish va mustahkamlash	Uchburchakning katta tomoni qarshisidagi burchak haqida teorema	Darslikning 138-sahifasidagi teorema va 1-rasm bilan ishlash	Amaliy mashq va tatbiq (1, 2, 3)

	Teoremani qo‘llash	Darslikning 141-sahifasidagi 7-, 8-rasmlar bilan ishlash;	Amaliy mashq va tatbiq (24, 25)
Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	ABC uchburchakda: a) $AB < BC < AC$; b) $AB = AC < BC$ bo‘lsa, uchburchak burchaklarini taqqoslang. A burchak o‘tmas bo‘lishi mumkinmi? Darslikdagi 4-, 5-amaliy mashqlarni bajarish.
Uyga vazifa	1. Teoremani yod olib kelish. 2. Darslikdagi 6-, 7-amaliy mashqlarni yechish.		

Masalalar, yechimlari va ularga doir ko‘rsatmalar

1. ABC uchburchakda $\angle A > \angle B > \angle C$ bo‘lsa, uchburchak eng uzun tomonini aniqlang.

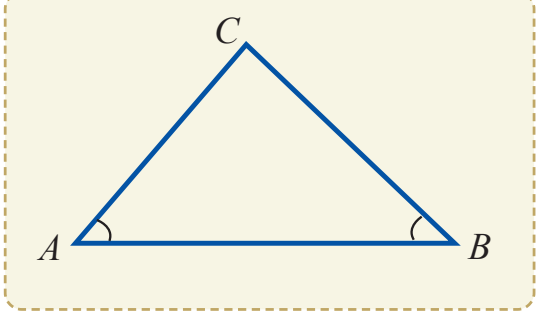


ABC uchburchakda $\angle A > \angle B > \angle C$ katta burchak qarshisida katta tomon yotadi.

Bundan $BC > AC > AB$ kelib chiqadi.

Javob: uchburchakning eng uzun tomoni BC.

2. ABC uchburchakda $\angle A - \angle B > \angle C$ bo‘lsa, uchburchakning eng kichik tomonini aniqlang.

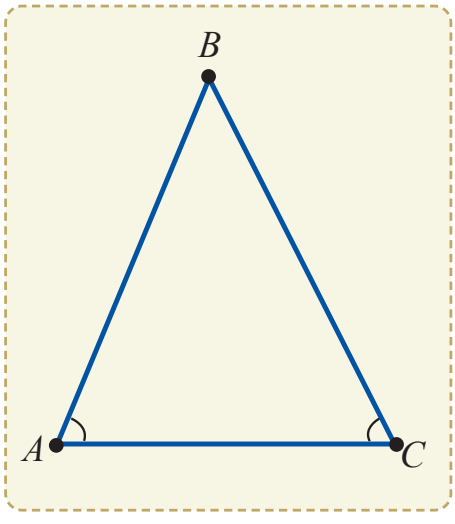


ABC uchburchakda $\angle A = \angle B < \angle C$ kichik burchak qarshisida kichik tomon yotadi.

Bundan, $AC = BC < AB$ kelib chiqadi .

Javob: uchburchakning eng kichik tomoni AC yoki BC $(AB = BC)$.

3. ABC uchburchakda $A - B > C$ bo‘lsa, uchburchak a) eng katta; b) eng kichik burchagini aniqlang.



a) ABC uchburchakda $AB = BC > AC$ katta tomon qarshisida katta burchak yotadi.

Bundan $\angle A = \angle C > \angle B$ kelib chiqadi.

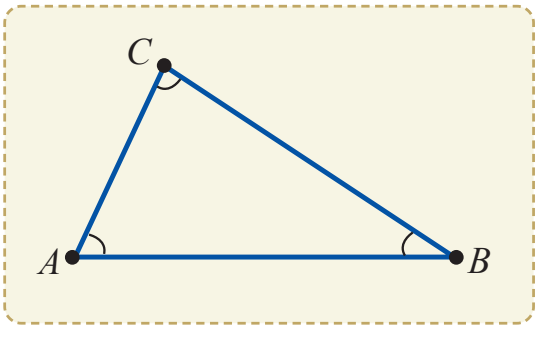
b) ABC uchburchakda $AB = BC > AC$ kichik tomon qarshisida kichik burchak yotadi.

Bundan $\angle A = \angle C > \angle B$ kelib chiqadi.

Javob: a) Uchburchakning eng katta burchagi $\angle A$ yoki $\angle C$;

b) Uchburchakning eng kichik burchagi $\angle B$.

4. ABC uchburchakda $AB > BC > AC$ bo‘lsa, uchburchak a) eng katta; b) eng kichik burchagini aniqlang.



ABC uchburchakda $AB > BC > AC$ katta tomon qarshisida katta burchak yotadi.

Bundan, $\angle C > \angle A > \angle B$ kelib chiqadi.

Javob: a) eng katta burchagi $\angle C$;

b) eng kichik burchagi $\angle B$.

5. Uzunliklari a) 2 m, 2 m va 3 m; b) 1 dm, 2 dm va 3 dm bo‘lgan kesmalardan uchburchak yasash mumkinmi?

a) $a = 2\ m;\quad b = 2\ m;\quad c = 3\ m.$

$$\begin{cases} a+b>c \\ a+c>b \\ b+c>a \end{cases} \rightarrow \begin{cases} 2+2>3 \\ 2+3>2 \\ 2+3>2 \end{cases} \rightarrow \begin{cases} 4>3 & to‘g‘ri \\ 5>2 & to‘g‘ri \\ 5>2 & to‘g‘ri \end{cases}$$

Javob: mumkin.

b) $a = 1\ dm;\quad b = 2\ dm;\quad c = 3\ dm.$

$$\begin{cases} a+b>c \\ a+c>b \\ b+c>a \end{cases} \rightarrow \begin{cases} 1+2>3 \\ 1+3>2 \\ 2+3>1 \end{cases} \rightarrow \begin{cases} 3>3 & noto‘g‘ri \\ 5>2 & to‘g‘ri \\ 5>2 & to‘g‘ri \end{cases}$$

Javob: mumkin emas.

2-DARS

I. Standartlar:

M7.GO‘.MM.21. Uchburchak tengsizligi haqidagi teoremani biladi va undan masalalar yechishda foydalana oladi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– uchburchak tengsizligi haqidagi teoremani bilish;
– teoremadan masalalar yechishda foydalana olish.

Ko‘nikmalar:

– uchburchak tengsizligi haqidagi teoremani biladi va undan masalalar yechishda foydalana oladi.

III. Dars mazmunining qisqacha tavsifi:

– uchburchak tengsizligi haqidagi teorema;
– uchburchakning tomonlari va burchaklari orasidagi munosabatlar haqidagi teoremalar.

IV. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlari	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Uchburchak tomoni va burchagi orasida qanday bog‘liqlik bor?	“Aqliy hujum”	- Uchburchakning o‘tmas burchagi qarshisida kichik tomon yotishi mumkinmi?
Bilimlarni boyitish va mustahkamlash	Uchburchakning katta tomoni qarshisidagi burchak haqidagi teoremaga teskari teorema	Darslikning 138-sahifasidagi teoremani ishlash	Amaliy mashq va tatbiq (8, 9)
	Teoremani qo‘llash	Darslikning 138-sahifasidagi 2-, 3-rasmlar bilan ishlash	Amaliy mashq va tatbiq (10, 11)

Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikdagi 12-, 13-amaliy mashqlarni bajarish
Uyga vazifa	1. Teoremani yod olib kelish. 2. Darslikdagi 14-, 15-amaliy mashqlarni yechish.		

Masalalar, yechimlari va ularga doir ko‘rsatmalar

1. Teng yonli uchburchak tomonlari: a) 7 va 3; b) 10 va 5; c) 8 va 5 bo‘lsa, uchinchi tomonini toping.

a) $a = 7;\ b = 7;\ c = 3.$

$$\begin{cases} a+b>c \\ a+c>b \\ b+c>a \end{cases} \rightarrow \begin{cases} 7+7>3 \\ 7+3>7 \\ 7+3>7 \end{cases} \rightarrow \begin{cases} 14>3 & to‘g‘ri \\ 10>7 & to‘g‘ri \\ 10>7 & to‘g‘ri \end{cases}$$

Javob: 7.

b) $a = 10;\ b = 10;\ c = 7.$

$$\begin{cases} a+b>c \\ a+c>b \\ b+c>a \end{cases} \rightarrow \begin{cases} 10+10>7 \\ 10+7>10 \\ 10+7>10 \end{cases} \rightarrow \begin{cases} 20>7 & to‘g‘ri \\ 17>10 & to‘g‘ri \\ 17>10 & to‘g‘ri \end{cases}$$

Javob: 10.

c) **1-hol.** $a = 8;\ b = 8;\ c = 5.$

$$\begin{cases} a+b>c \\ a+c>b \\ b+c>a \end{cases} \rightarrow \begin{cases} 8+8>5 \\ 8+5>8 \\ 8+5>8 \end{cases} \rightarrow \begin{cases} 16>5 & to‘g‘ri \\ 13>8 & to‘g‘ri \\ 13>8 & to‘g‘ri \end{cases}$$

2-hol. $a = 8;\ b = 5;\ c = 5.$

$$\begin{cases} a+b>c \\ a+c>b \\ b+c>a \end{cases} \rightarrow \begin{cases} 8+5>5 \\ 8+5>5 \\ 5+5>8 \end{cases} \rightarrow \begin{cases} 13>5 & to‘g‘ri \\ 13>5 & to‘g‘ri \\ 10>8 & to‘g‘ri \end{cases}$$

Javob: 7 yoki 5.

2. Uchburchakning perimetri $34\ dm$**. Uning bitta tomoni: a)** $16\ dm$**; b)** $17\ dm$**; c)** $18\ dm$ **bo‘lishi mumkinmi? Nega?**

a) Berilgan: $P = 34\ dm;\ a = 16\ dm.$ Topish kerak: $b + c = ?$

$a + b + c = P;$ $b + c = P\text{-}a;$ $b + c = 34\ dm\text{-}16\ dm = 18\ dm;$

$b + c = 18\ dm;$ $b + c > a;$ $18\ dm > 16\ dm.$

Javob: mumkin. Uchburchakning ikki tomoni yig‘indisi uchinchi tomonidan katta bo‘lishi zarur. Teng ham, kichik ham bo‘lmasligi kerak. Aks holda, uchburchak hosil bo‘lmaydi.

b) Berilgan: $P = 34\ dm;$ $a = 17\ dm.$ Topish kerak: $b + c = ?$

$a + b + c = P;$ $b + c = P - a;$ $b + c = 34\ dm - 17\ dm = 17\ dm;$

$b + c = 17\ dm;$ $b + c > a;$ $17\ dm > 17\ dm.$ Noto‘g‘ri.

Javob: mumkin emas. Uchburchak hosil bo‘lmaydi.

c) Berilgan: $P = 34\ dm;$ $a = 18\ dm.$ Topish kerak: $b + c = ?$

$a + b + c = P;$ $b + c = P\text{-}a;$ $b + c = 34\ dm - 18\ dm = 16\ dm;$

$b + c = 16\ dm;$ $b + c > a;$ $16\ dm > 18\ dm.$ Noto‘g‘ri.

Javob: mumkin emas. Uchburchak hosil bo‘lmaydi.

3. Uchburchakning perimetri 12 ga teng. Uning bitta tomoni: a) 5; b) 6; c) 8 ga teng bo‘lishi mumkinmi? Nega?

a) Berilgan: $P = 12;$ $a = 5.$ Topish kerak: $b + c = ?$

$a + b + c = P;$ $b + c = P - a;$ $b + c = 12 - 5 = 7;$

$b + c = 7;$ $b + c > a;$ $7 > 5.$

Javob: mumkin. Uchburchakning ikki tomoni yig‘indisi uchinchi tomonidan katta bo‘lishi zarur. Teng ham, kichik ham bo‘lmasligi kerak. Aks holda uchburchak hosil bo‘lmaydi.

b) Berilgan: $P = 12;$ $a = 6.$ Topish kerak: $b + c = ?$

$a + b + c = P;$ $b + c = P - a;$ $b + c = 12 - 6 = 6;$

$b + c = 6;$ $b + c > a;$ $6 > 6.$ Noto‘g‘ri.

Javob: mumkin emas. Uchburchak hosil bo‘lmaydi.

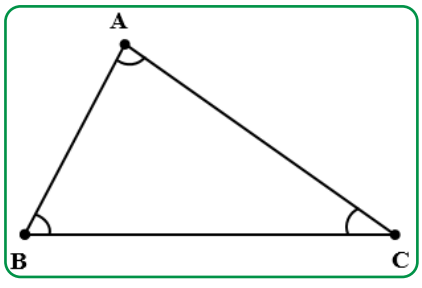
c) Berilgan: $P = 12;$ $a = 8.$ Topish kerak: $b + c = ?$

$a + b + c = P;$ $b + c = P - a;$ $b + c = 12 - 8 = 4\ dm;$

$b + c = 4;$ $b + c > a;$ $4 > 8.$ Noto‘g‘ri.

Javob: mumkin emas. Uchburchak hosil bo‘lmaydi.

4*. ABC **uchburchakda: a)** $BC = 9,\ AC = 8,\ AB = 7$; **b)** $BC = 9,\ AC = 8;\ AB = 8$; **c)** $BC = 9, AC = 9, AB = 8$ **bo‘lsa, uning eng katta va eng kichik burchaklarini aniqlang.**

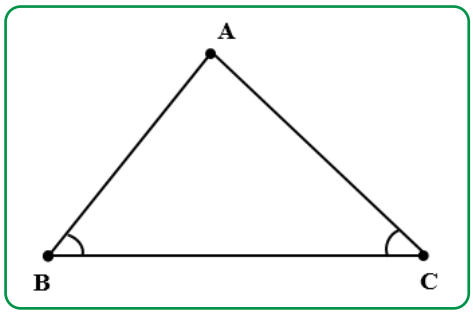


a) $BC = 9,\quad AC = 8,\quad AB = 7.$

Katta tomon qarshisida katta burchak yotadi.

$AB < AC < BC;\quad \angle C < \angle B < A.$

Javob: eng katta burchak – A, eng kichik burchak – C.

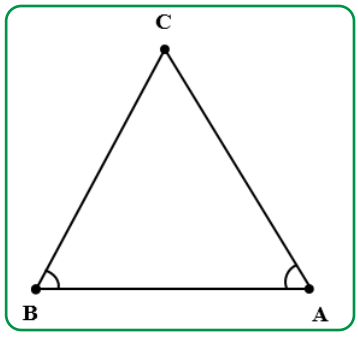


b) $BC = 9,\quad AC = 8,\quad AB = 8.$

Kichik tomon qarshisida kichik burchak yotadi.

$AB = AC < BC;\quad \angle C = \angle B < \angle A.$

Javob: eng katta burchak – A, eng kichik burchak – C yoki B.



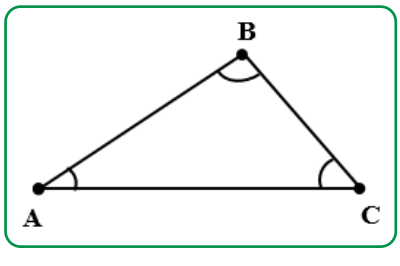
c) $BC = 9,\quad AC = 9,\quad AB = 8.$

Katta tomon qarshisida katta burchak yotadi.

$AB < AC = BC;\quad \angle C < \angle B = \angle A.$

Javob: eng katta burchak – A yoki B, eng kichik burchak – C.

5. Agar a) $\angle A = 25°, \angle B = 100°$; **b)** $\angle A = 40°, \angle B = 100°$; **c)** $\angle A = 60°, \angle B = 60°$ **bo‘lsa,** ABC **uchburchak tomonlarini o‘zaro taqqoslang.**



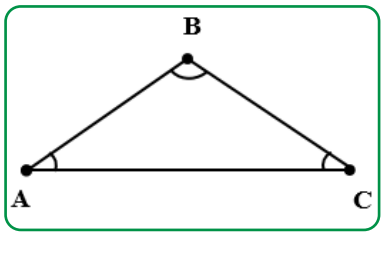
a) $\angle A = 25°, \angle B = 100°.$

$\angle A + \angle B + \angle C = 180°;\quad 25° + 100° + \angle C = 180°;$

$125° + \angle C = 180°;\quad \angle C = 180° - 125° = 55°;$

$25° < 55° < 100°.$

Javob: $BC < AB < AC.$



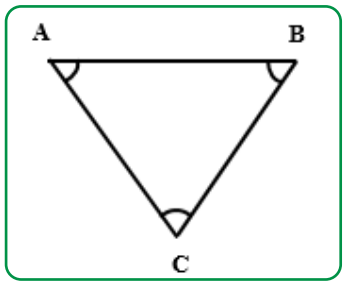
b) $\angle A = 40°, \angle B = 100°.$

$\angle A + \angle B + \angle C = 180°;\quad 40° + 100° + \angle C = 180°;$

$140° + \angle C = 180°;\quad \angle C = 180° - 140° = 40°;$

$40° = 40° < 100°.$

Javob: $BC = AB < AC$.



c) $\angle A = 60°$, $\angle B = 60°$.

$\angle A + \angle B + \angle C = 180°$; $60° + 60° + \angle C = 180°$;

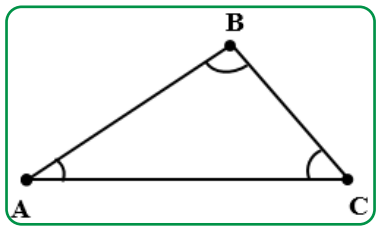
$120° + \angle C = 180°$; $\angle C = 180° - 120° = 60°$;

$60° = 60° = 60°$.

Javob: $BC = AC = AB$.

6. Uchburchakning istagan tomoni uning qolgan ikkita tomoni ayirmasidan katta bo‘lishini isbotlang.

$a = BC$; $b = AC$; $c = AB$.



$$\begin{cases} BC > AC - AB \\ AC > AB - BC \\ AB > AC - BC \end{cases} \rightarrow \begin{cases} a > b - c \\ b > c - a \\ c > b - a \end{cases}$$

3-DARS

I. Standartlar:

M7.GO‘.GSH.15. Uchburchakning tomonlari va burchaklarini taqqoslay oladi (katta tomon qarshisida katta burchak yotadi va aksincha).

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– uchburchakning tomonlari va burchaklarini taqqoslay olish.

Ko‘nikmalar:

– uchburchakning tomonlari va burchaklarini taqqoslay oladi.

III. Dars mazmunining qisqacha tavsifi:

– uchburchak tengsizligi haqidagi teorema;
– uchburchakning tomonlari va burchaklari orasidagi munosabatlar haqidagi teoremalar.

IV. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Uchburchak tomoni va burchagi orasida qanday bog‘liqlik bor?	“Aqliy hujum”	Uchburchakning o‘tkir burchagi qarshisida katta tomon yotishi mumkinmi?
Bilimlarni boyitish va mustahkamlash	Uchburchak tengsizligi haqida teorema	Darslikning 139-sahifasidagi teorema va 5-rasm bilan ishlash	1. Uchburchak tengsizligi qanday masalalarni yechishda qo‘llanadi? 2. Amaliy mashq va tatbiq (16, 17)
	Teoremadan kelib chiqadigan natijalar	Darslikning 139-sahifasidagi 2-, 3-natijalar bilan ishlash	Amaliy mashq va tatbiq (18, 19)

Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikdagi 20-, 21-amaliy mashqlarni bajarish
Uyga vazifa	1. 6-savolga javob berish. 2. Darslikdagi 22-, 23-amaliy mashqlarni yechish.		

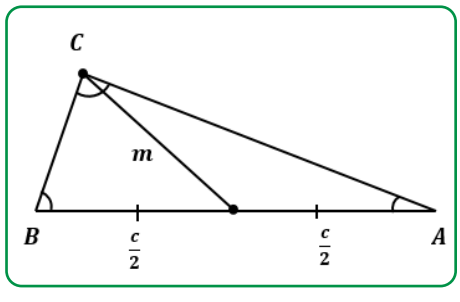
Masalalar, yechimlari va ularga doir ko‘rsatmalar

1. Tekislikdagi uchta A,B,C nuqtalar uchun $AB + BC \geq AC$ tengsizlik bajarilsa, AB, BC va AC kesmalar qanday geometrik shaklni ifodalaydi?

$AB + BC = AC$ bo‘lsa, kesmani ifodalaydi.

$AB + BC > AC$ bo‘lsa, uchburchakni ifodalaydi.

2.* Uchburchak medianasi uchburchakning yarim perimetridan (perimetrining yarmidan) kichik ekanligini isbotlang.



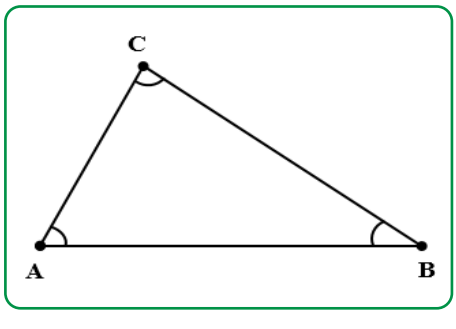
$a = BC;\ b = AC;\ c = AB.$

$$\begin{cases} a + \frac{c}{2} > m \\ b + \frac{c}{2} > m \end{cases} \rightarrow \quad a + \frac{c}{2} + b + \frac{c}{2} > m + m;$$

$$a + b + \frac{c + c}{2} > 2m; \qquad a + b + \frac{2c}{2} > 2m; \qquad a + b + c > 2m;$$

$m < \frac{a + b + c}{2}$. Isbotlandi.

3. ABC uchburchakda $AB = 12\ cm,\ BC = 10\ cm,\ \ CA = 7\ cm$ bo‘lsa, uchburchakning eng katta va eng kichik burchaklarini toping.



$AB = 12\ cm;\ BC = 10\ cm;\ \ CA = 7\ cm.$

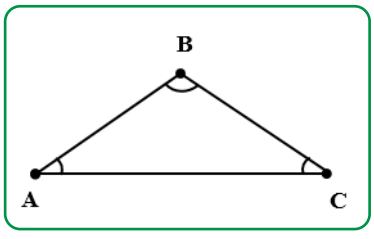
$7\ cm < 10\ cm < 12\ cm;\qquad CA < BC < AB;$

Katta tomon qarshisida katta burchak yotadi.

$\angle B < \angle A < \angle C.$

Javob: eng katta burchak – C, eng kichik burchak – B.

4. Teng yonli uchburchakning uchidagi burchagi $62°$ bo‘lsa, uning qaysi tomoni katta bo‘ladi? $58°$ bo‘lsa-chi?



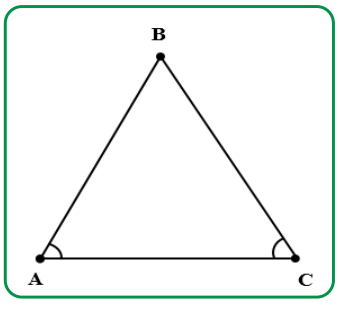
$AB = BC;\quad \angle B = 62°;\quad \angle A = \angle C;$

$\angle A + \angle B + \angle C = 180°;\quad \angle A + 62° + \angle A = 180°;$

$2 \cdot \angle A = 180° - 62°;\quad 2 \cdot \angle A = 118°;\quad \angle A = \frac{118°}{2};$

$\angle A = 59°;\ \angle C = \angle A = 59°;\ 59° = 59° < 62°;\ AB = BC < AC.$

Javob: teng yonli uchburchakning eng katta tomoni AC, ya’ni asosidir.



$AB = BC;\quad \angle B = 58°;\quad \angle A = \angle C;$

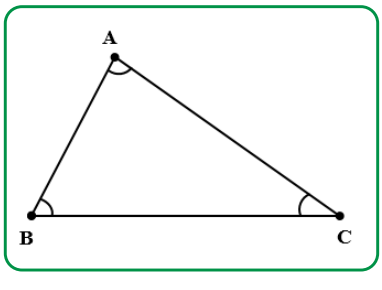
$\angle A + \angle B + \angle C = 180°;\quad \angle A + 58° + \angle A = 180°;$

$2 \cdot \angle A = 180° - 58°;\quad 2 \cdot \angle A = 122°;$

$\angle A = 61°;\quad \angle C = \angle A = 61°;\quad 58° < 61° = 61°;$

$AC < AB = BC.$

5. ABC uchburchakda a) $\angle A > \angle B > \angle C$; b) $\angle A = \angle B < \angle C$ bo‘lsa, uchburchak tomonlarini taqqoslang.

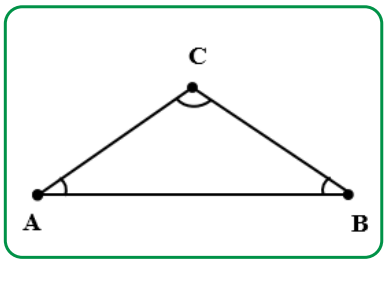


a) $\angle A > \angle B > \angle C.$

ABC uchburchakda

$\angle A > \angle B > \angle C$ katta burchak qarshisida katta tomon yotadi. Bundan $BC > AC > AB$ kelib chiqadi.

Javob: $BC > AC > AB.$



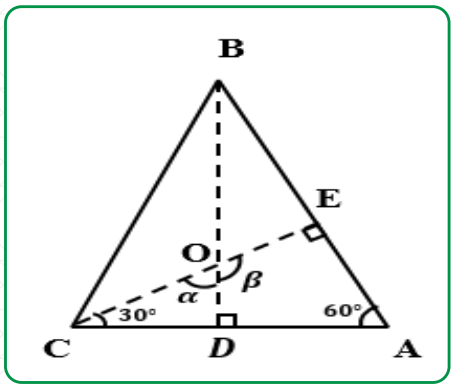
b) $\angle A = \angle B > \angle C.$

ABC uchburchakda

$\angle A = \angle B > \angle C$ katta burchak qarshisida katta tomon yotadi. Bundan $BC = AC < AB$ kelib chiqadi.

Javob: $BC = AC < AB.$

6. Teng tomonli uchburchakning ikkita bissektrisasi kesishganda hosil bo‘ladigan burchaklarni toping.



Berilgan: $AB = BC = AC;\ \angle A = \angle B = \angle C = 60°;$

Topish kerak: $\alpha = ?,\ \beta = ?$

$$\angle ACE = \angle BCE = \frac{\angle C}{?} = \frac{60°}{?} = 30°;$$

$\angle ACE = 30°;$

$\angle ACE + \angle COD + \angle CDO = 180°;$

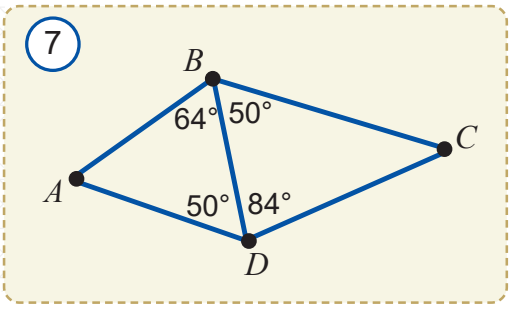
$30° + \alpha + 90° = 180°;\quad 120° + \alpha = 180°;\quad \alpha = 180° - 120° = 60°.$

Vertikal burchak $\alpha = \angle BOE = 60°;\quad \alpha + \beta = 180°;\quad 60° + \beta = 180°;$

$\beta = 180° - 60° = 120°.$ Vertikal burchak $\beta = \angle BOC = 120°.$

Javob: $60°;\quad 120°;\quad 60°;\quad 120°.$

7.* 7-rasmdan eng katta va eng kichik kesmalarni ko‘rsating. Javobingizni izohlang.



$\angle ABD = 64°;\ \angle BDA = 50°;\ \angle CBD = 50°;$

$\angle BDC = 84°;\ \angle ABD + \angle BDA + \angle A = 180°;$

$64° + 50° + \angle A = 180°;\ 114° + \angle A = 180°;$

$\angle A = 180° - 114° = 66°;\ \angle A = 66°;$

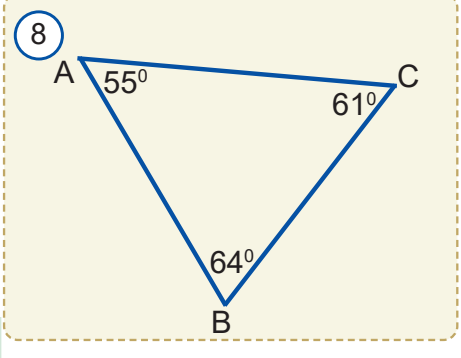
$\angle C = 180° - (\angle CBD + \angle BDC) = 180° - (50° + 84°) = 180° - 134° = 46°.$

$$\begin{cases}\Delta ABD\ da\\ \Delta BCD\ da\end{cases} \rightarrow \begin{cases}50° < 64° < 66°\\ 46° < 50° < 84°\end{cases} \rightarrow \begin{cases}\angle ADB < \angle ABD < \angle A\\ \angle C < \angle CBD < \angle BDC\end{cases} \rightarrow$$

$$\begin{cases}AB < AD < BD\\ BD < CD < BC\end{cases} \rightarrow \begin{cases}AB < BD\\ BD < BC\end{cases} \rightarrow AB < BC.$$

Javob: Eng katta kesma BC, eng kichik kesma AB.

8. 8-rasmdagi uchburchakning eng kichik tomonni toping.



$\angle A = 55°;\quad \angle B = 64°;\quad \angle C = 61°.$

Kichik burchak qarshisida kichik tomon yotadi.

$55° < 61° < 64°;\quad \angle A < \angle C < \angle B.$ Bundan

$BC < AB < AC.$

Javob: uchburchakning eng kichik tomoni – BC.

V bob. YASASHGA DOIR MASALALAR

SIRKUL VA CHIZG‘ICH YORDAMIDA GEOMETRIK YASASH–GA DOIR MASALALAR. (2 soat)

1-DARS

I. Standartlar:

M7.GO‘.YM.03. Burchak bissektrisasini yasay oladi.

M7.GO‘.YM.04. To‘g‘ri chiziqqa perpendikulyar o‘tkazish algoritmini biladi va buni bajara oladi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– burchak bissektrisasini yasay olish;
– to‘g‘ri chiziqqa perpendikulyar o‘tkazish algoritmini bilish.

Ko‘nikmalar:

– burchak bissektrisasini yasay oladi;
– to‘g‘ri chiziqqa perpendikulyar o‘tkazish algoritmini biladi va buni bajara oladi.

III. Dars mazmunining qisqacha tavsifi:

– geometrik yasashlarga oid qoidalar;
– geometrik yasashga doir asosiy masalalar; berilgan burchakka teng burchakni yasash;
– burchak bissektrisasini yasash;
– berilgan to‘g‘ri chiziqqa perpendikulyar to‘g‘ri chiziq yasash.

IV. Dars ashyolari va ko‘rgazmali qurollar:

– chizg‘ich, sirkul, transportir.

V. Darsning qisqacha texnologik xaritasi:

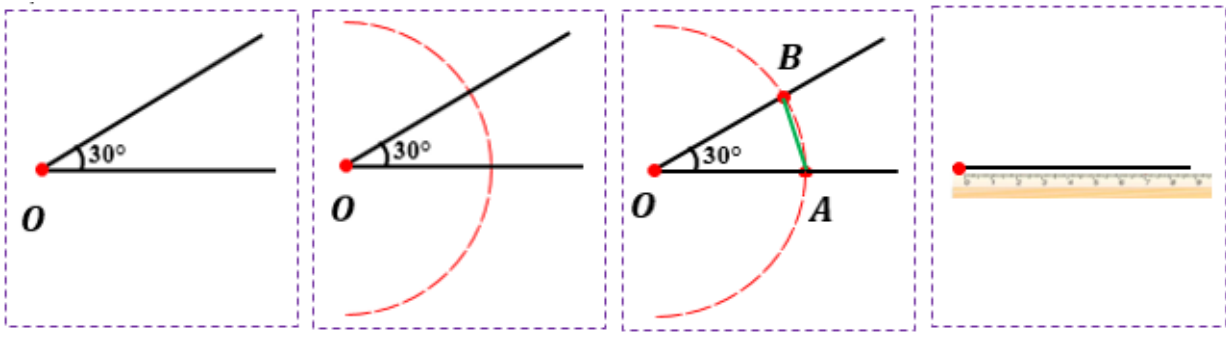
Dars bos-qichlari	Tafsilotlar	Uslubiy tavsi-yalar	Savollar va yechiladigan masalalar
Motivatsiya	Chizg‘ich va sirkul yordamida qanday geometrik shakllar yasash mumkin?	Tarmoqlash usuli	Yasashga doir masalalarni yechishda oddiy chizg‘ich va sirkul yordamida qanday ishlarni amalga oshirish mumkin?

Bilimlarni boyitish va mustahkamlash	Berilgan burchakka teng burchakni yasash	Darslikning 153-sahifasidagi teorema va 3-, 4-, 5-, 6-rasmlar bilan ishlash	Amaliy mashq va tatbiq (1, 2, 3)
	Burchak bissektrisasini yasash	Darslikning 154-sahifasidagi 8-, 10-, 11-rasmlar bilan ishlash	1. Nima sababdan yasashga doir masalalarni yechishda bajarilgan yasashlarni asoslash zarur? 2. Amaliy mashq va tatbiq (4, 5)
Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikdagi 6-, 7-, 8-amaliy mashqlarni bajarish
Uyga vazifa	1. To‘g‘ri burchakni sirkul va chizg‘ich yordamida teng uchga bo‘lish. 2. Darslikdagi 9-, 10-, 11-amaliy mashqlarni yechish.		

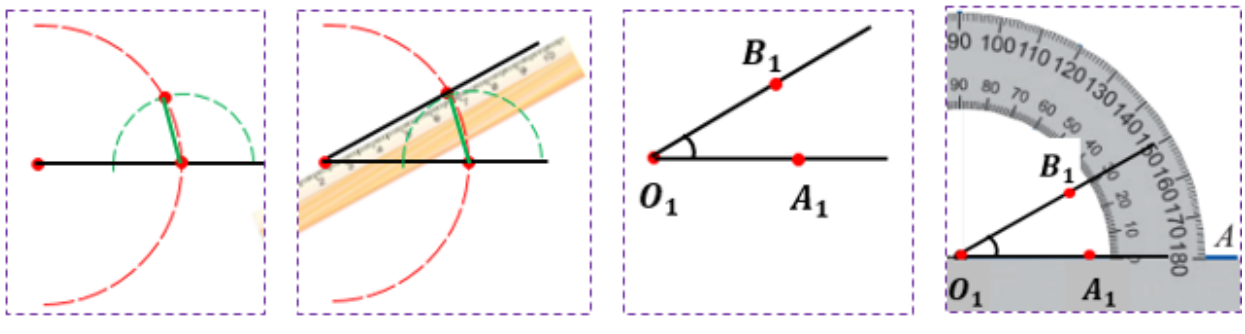
Masalalar, yechimlari va ularga doir ko‘rsatmalar

1. a) 30°; b) 60°; c) 15°; d)120°; e) 45° li burchaklar berilgan. Oddiy chizg‘ich va sirkuldan foydalanib ularga teng burchaklarni yasang.

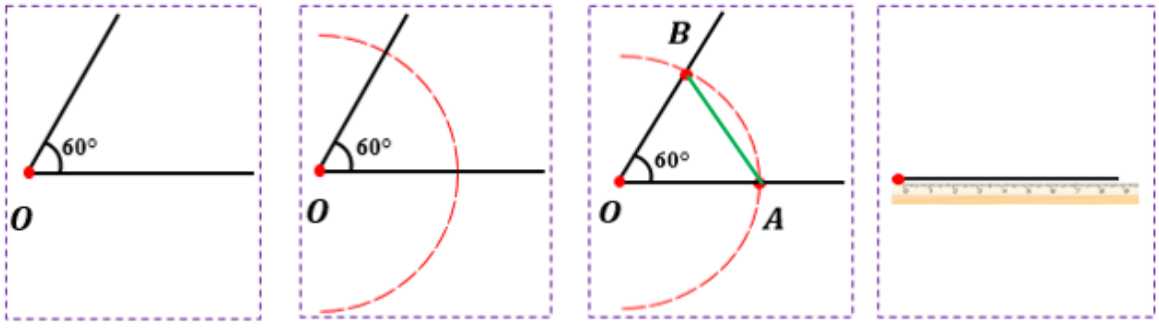
a) 1-hol 2-hol 3-hol 4-hol



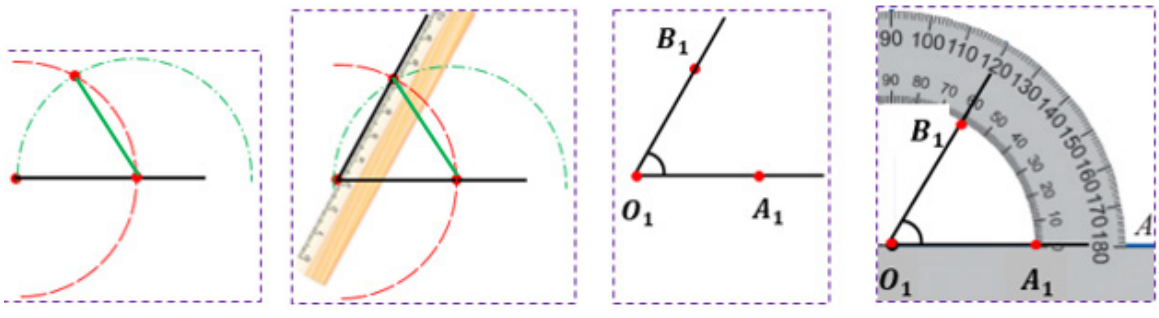
5-hol 6-hol 7-hol 8-hol



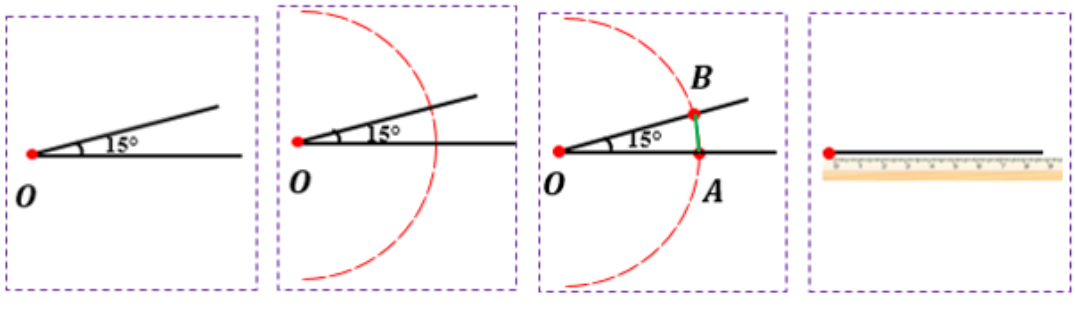
b) 1-hol 2-hol 3-hol 4-hol



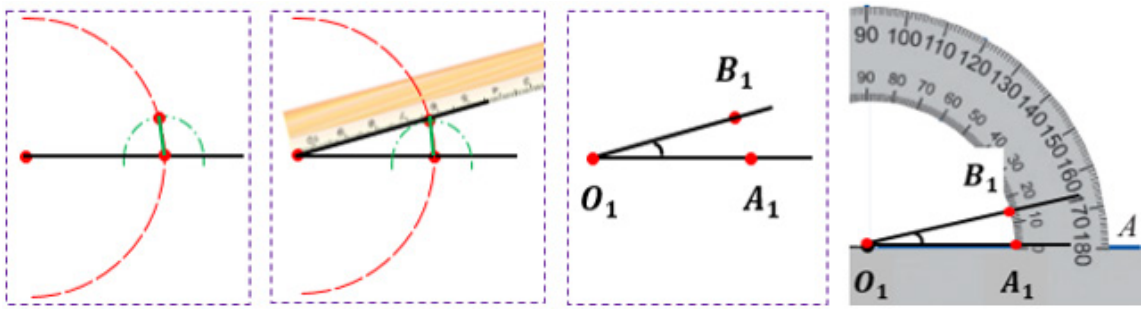
5-hol 6-hol 7-hol 8-hol



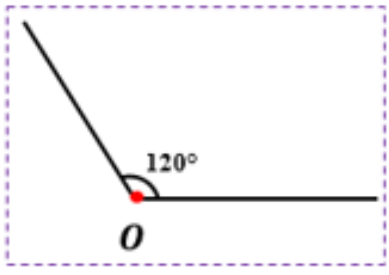
c) 1-hol 2-hol 3-hol 4-hol

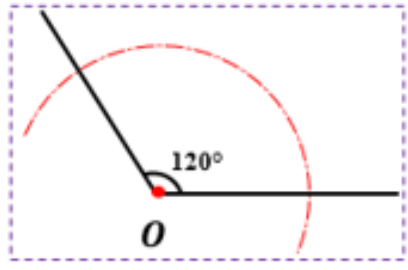


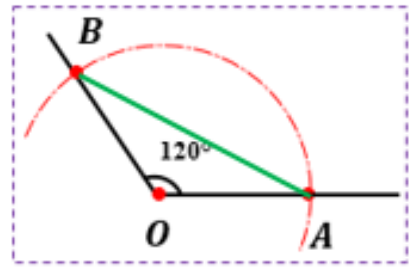
5-hol 6-hol 7-hol 8-hol



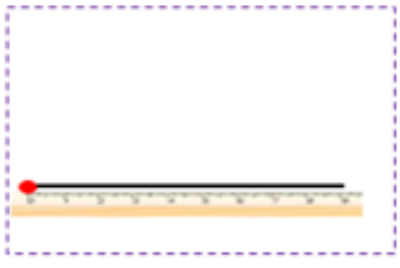
d) 1-hol 2-hol 3-hol

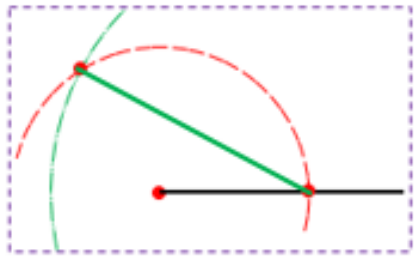


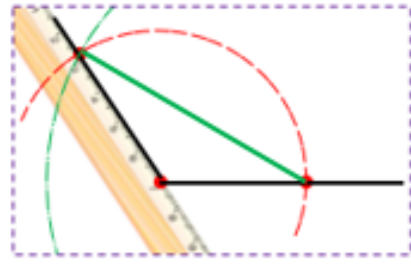




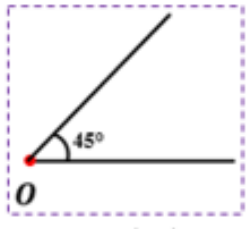
4-hol 5-hol 6-hol

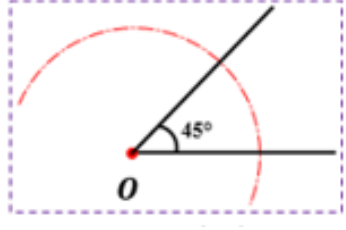


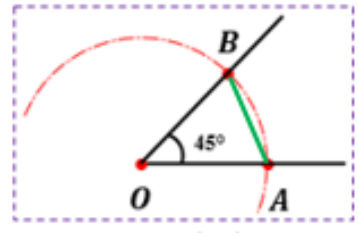




e) 1-hol 2-hol 3-hol

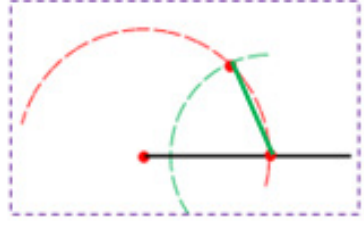


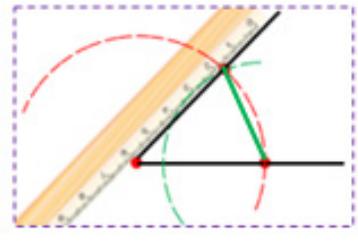




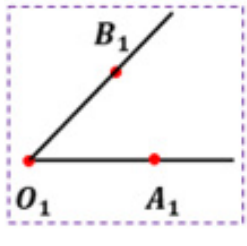
4-hol 5-hol 6-hol

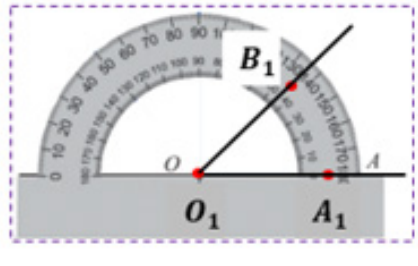






7-hol 8-hol

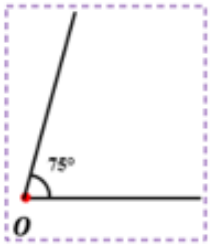




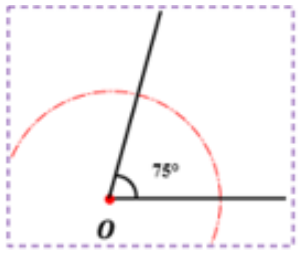
2. a) 75°; b) 90°; c) 135° li burchaklar berilgan. Oddiy chizg‘ich va sirkuldan foydalanib, ularga teng burchaklarni yasang.

a)

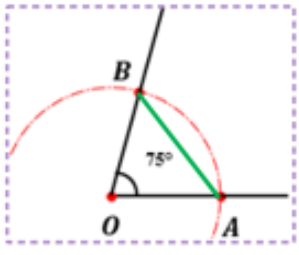
1-hol



2-hol



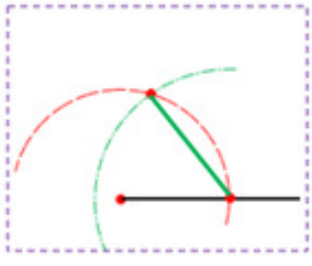
3-hol



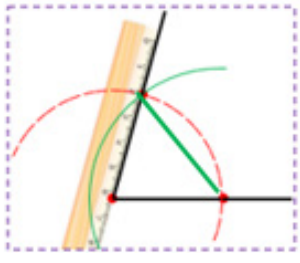
4-hol



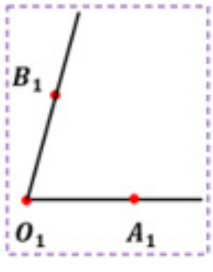
5-hol



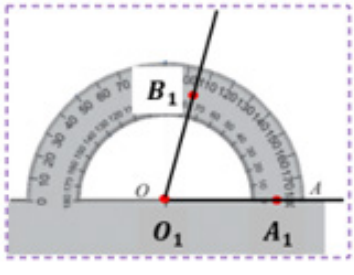
6-hol



7-hol

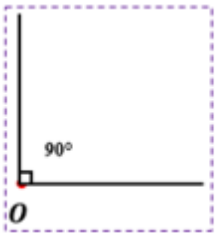


8-hol

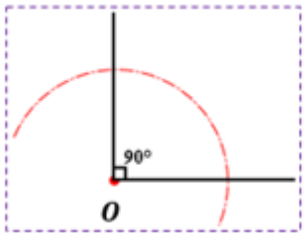


b)

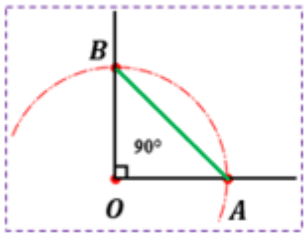
1-hol



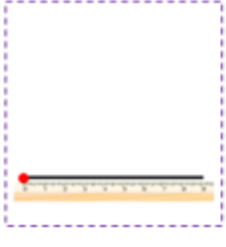
2-hol



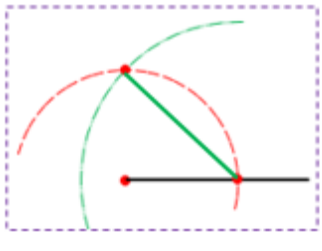
3-hol



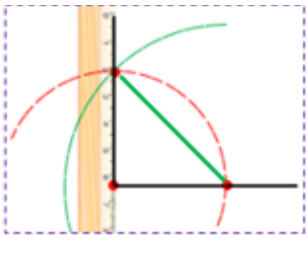
4-hol



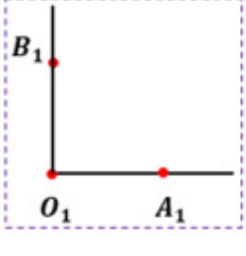
5-hol



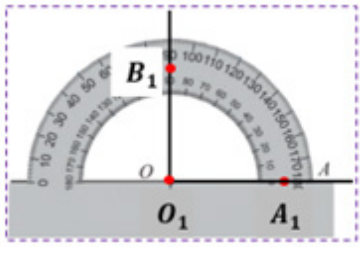
6-hol



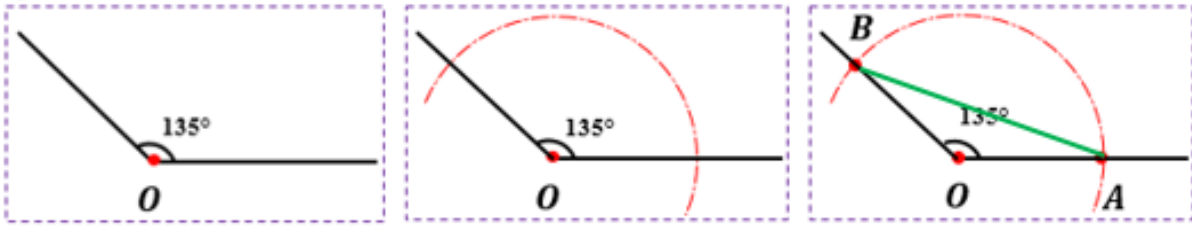
7-hol



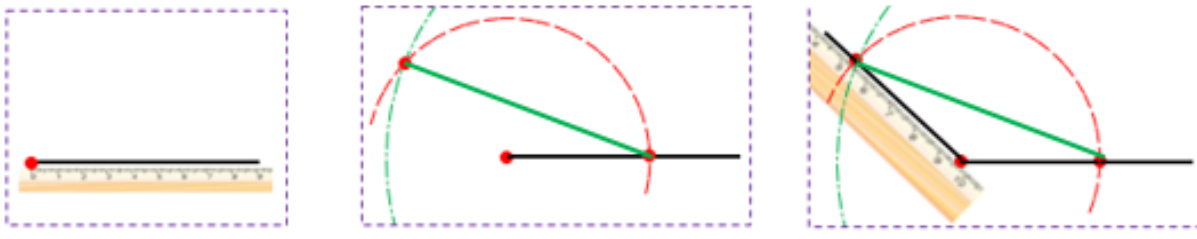
8-hol



c) 1-hol 2-hol 3-hol



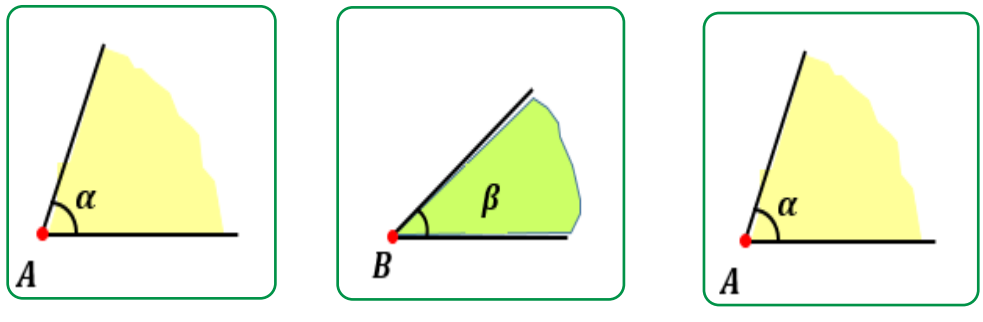
4-hol 5-hol 6-hol



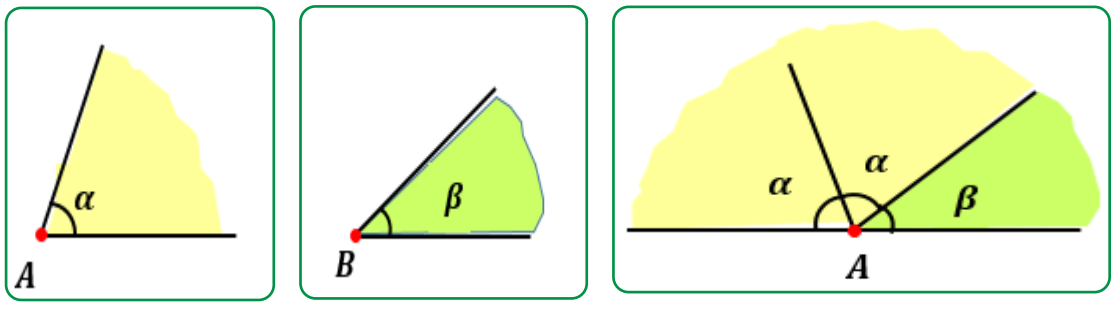
7-hol 8-hol



3. $\angle A = \alpha$ **va** $\angle B = \beta$ **burchaklar berilgan** $(\alpha > \beta)$**. O‘lchovi: a)** 2α**; b)** $\alpha - \beta$**; c)** $2\alpha + \beta$ **bo‘lgan burchaklarni yasang.**

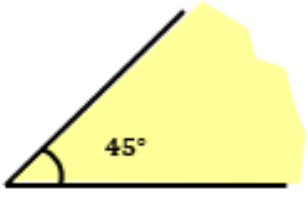


$\angle A = \alpha;$ $\angle B = \beta;$ $\alpha > \beta.$ Yasash kerak: $2\alpha + \beta = ?$

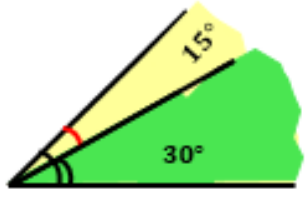


4. 45° va 30° burchaklar berilgan. O‘lchovi a) 15°; b) 75°; c) 105°; d) 120° bo‘lgan burchaklarni yasang.

a) $\alpha = 45°$ $\beta = 30°$ $\alpha - \beta = 45° - 30° = 15°$

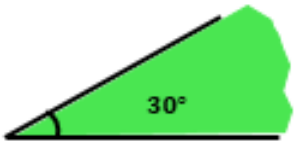


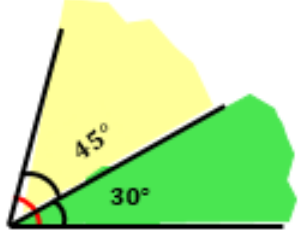




b) $\alpha = 45°$ $\beta = 30°$ $\alpha + \beta = 45° + 30° = 75°$

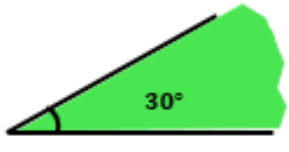


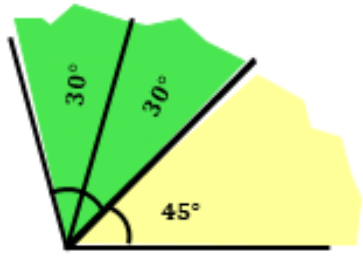




c) $\alpha = 45°$ $\beta = 30°$ $\alpha + 2\beta = 45° + 2 \cdot 30° = 45° + 60° = 105°$

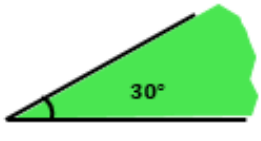






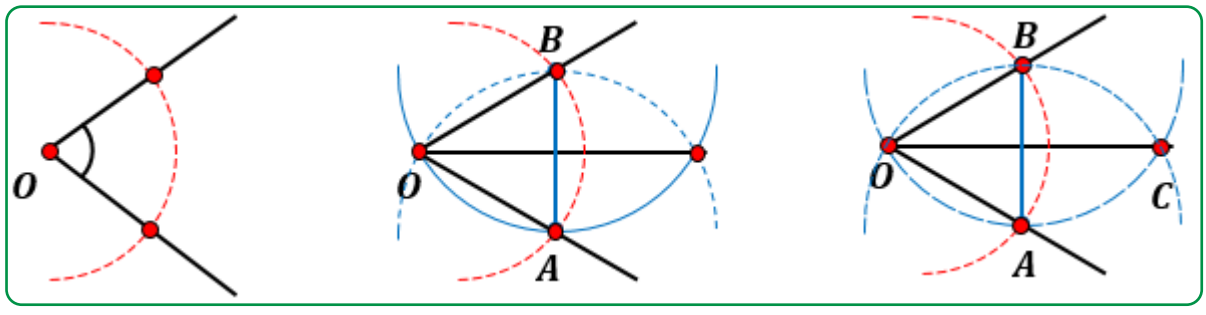
d) $\alpha = 45°$ $\beta = 30°$ $2\alpha + \beta = 2 \cdot 45° + 30° = 90° + 30° = 120°$

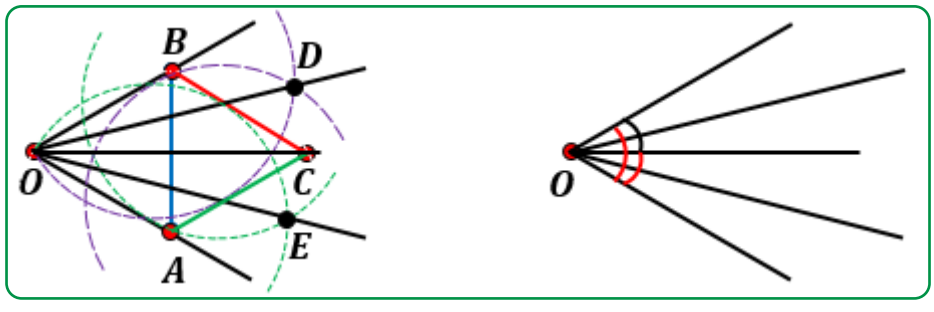




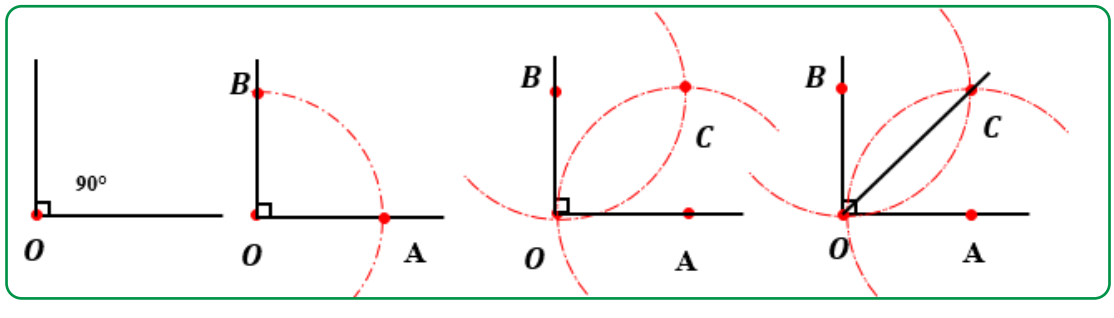


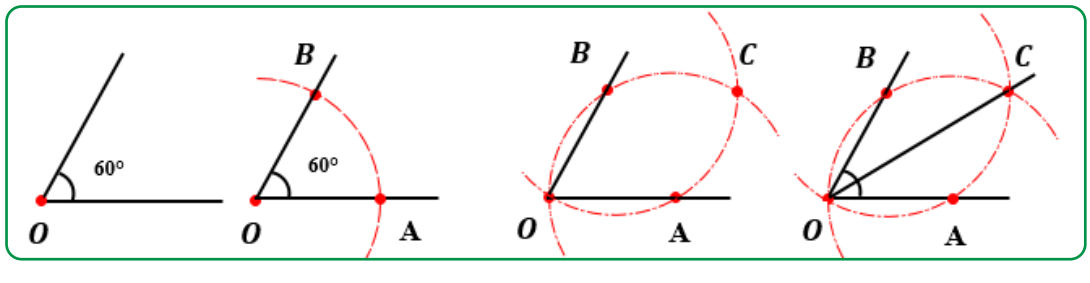
5. Burchak chizing va uni to‘rtta teng burchakka ajrating.

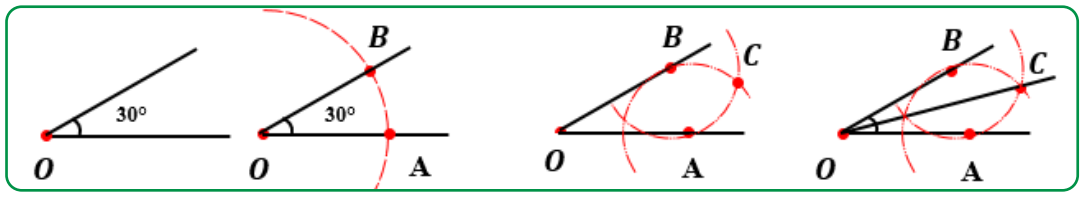




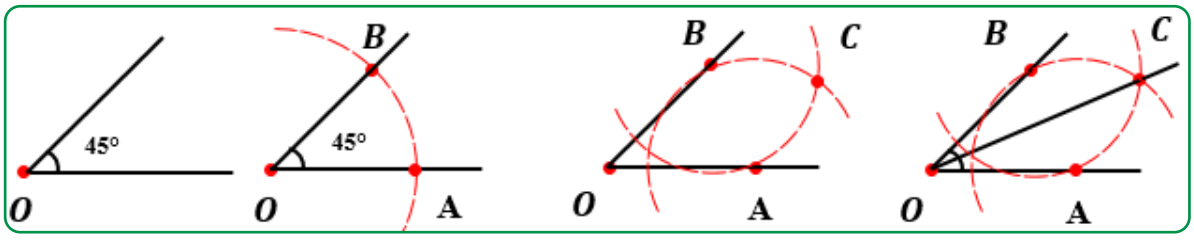
6. Oddiy chizg‘ich va sirkul yordamida: a) 90°; b) 60°; c) 30° li burchaklarni teng ikkiga bo‘ling.





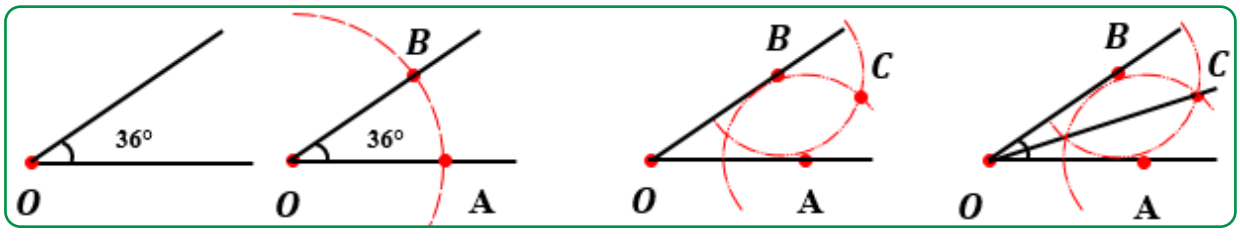


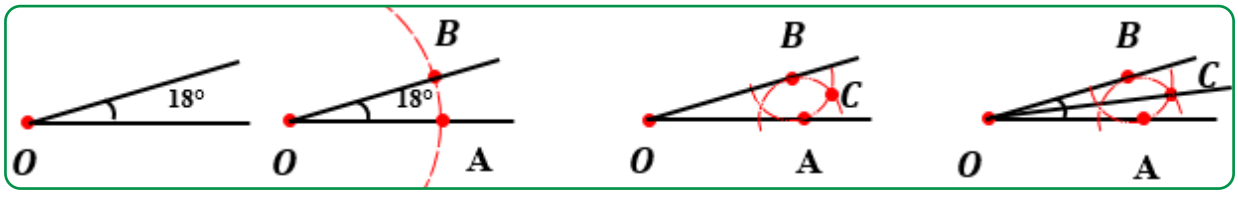
7. 45° li burchakni uchta teng burchakka bo‘ling.



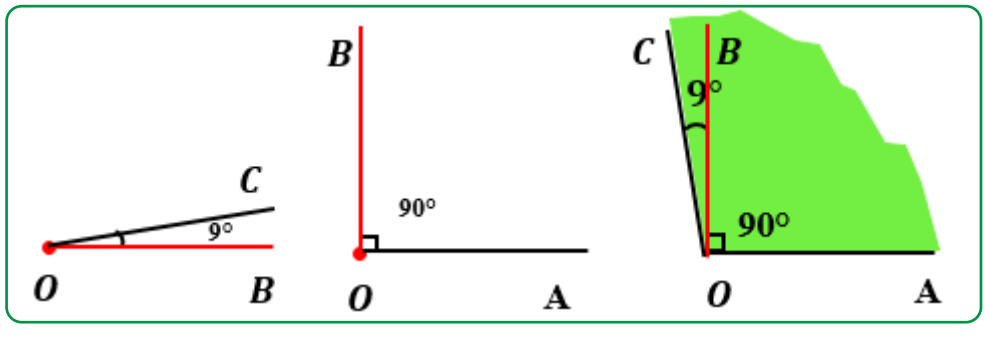
8*. 36° li burchak berilgan. Sirkul va oddiy chizg‘ich yordamida 99° li burchak yasang.

$$\alpha = 36^\circ; \qquad \beta = 99^\circ; \qquad \alpha_1 = \frac{\alpha}{4} = \frac{36^\circ}{4} = 9^\circ; \qquad n = \frac{\beta}{\alpha_1} = \frac{99^\circ}{9^\circ} = 11.$$





$\beta = n \cdot \alpha_1 = 11 \cdot 9^\circ = 99^\circ$



2-DARS

I. Standartlar:

M7.GO‘.YM.05. Kesmani teng ikkiga bo‘lish algoritmini biladi va shu asosida kesmani teng ikkiga bo‘la oladi.
M7.GO‘.YM.06. Sirkul va oddiy chizg‘ich yordamida berilgan burchakka teng burchakni yasay oladi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– kesmani teng ikkiga bo‘lish algoritmini bilish;
– sirkul va oddiy chizg‘ich yordamida berilgan burchakka teng burchakni yasay olish.

Ko‘nikmalar:

– kesmani teng ikkiga bo‘lish algoritmini biladi va shu asosida kesmani teng ikkiga bo‘la oladi;
– sirkul va oddiy chizg‘ich yordamida berilgan burchakka teng burchakni yasay oladi.

III. Dars mazmunining qisqacha tavsifi:

– berilgan kesmani teng ikkiga bo‘lish;
– uchburchakni berilgan uch tomoniga ko‘ra yasash.

IV. Dars ashyolari va ko‘rgazmali qurollar:

– chizg‘ich, sirkul, transportir.

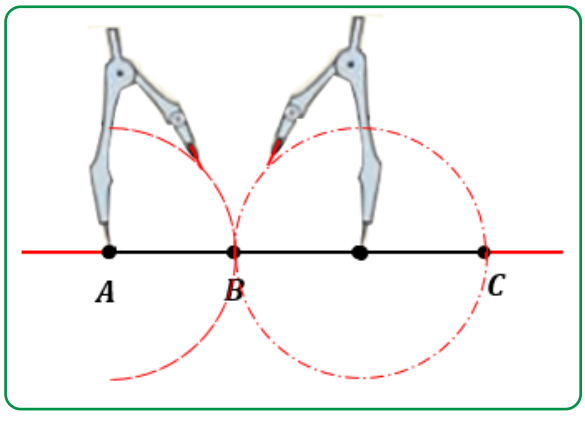
V. Darsning qisqacha texnologik xaritasi:

Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Chizg‘ich va sirkul yordamida qanday geometrik shakllar yasash mumkin?	Tarmoqlash usuli	Geometrik yasashlarga doir asosiy masalalarni sanang.
Bilimlarni boyitish va mustahkamlash	Berilgan to‘g‘ri chiziqqa unda yotmagan nuqtadan perpendikulyar tushirish	Darslikning 156-sahifasidagi 17-, 18-, 19-rasmlar bilan ishlash	Amaliy mashq va tatbiq (12, 13, 14)

	Uchburchakni berilgan uch tomoniga ko‘ra yasash	Darslikning 158-sahifasidagi 25-, 26-, 28-rasmlar bilan ishlash	Amaliy mashq va tatbiq (15, 16)
Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikdagi 17-, 18-, 19-amaliy mashqlarni bajarish
Uyga vazifa	1. Geometrik yasashga doir murakkabroq masalalarni yechishning qanday bosqichlari bor? 2. Darslikdagi 20-, 21-, 22-amaliy mashqlarni yechish.		

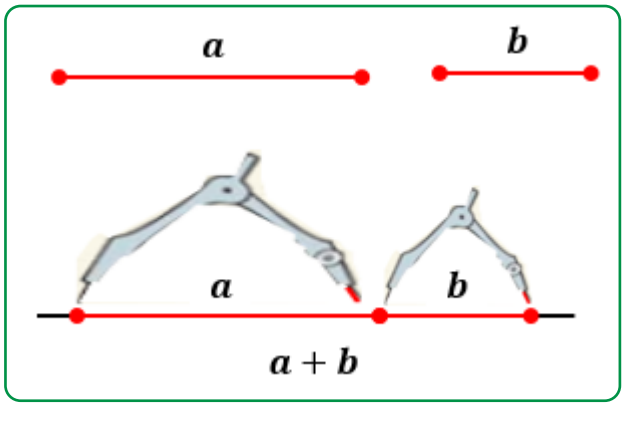
Masalalar, yechimlari va ularga doir ko‘rsatmalar

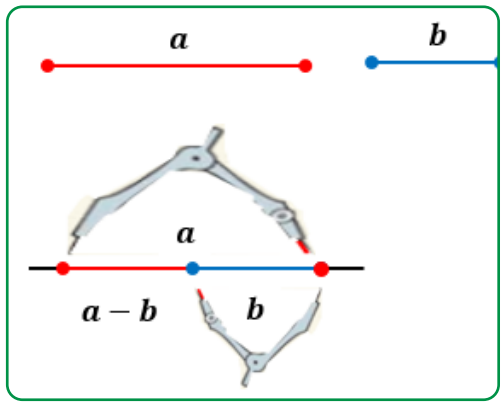
12. A va B nuqtalar berilgan. Faqat sirkuldan foydalanib shunday C nuqta yasangki, $AC - 3AB$ bo‘lsin.



a to‘g‘ri chiziqda A va B nuqtalarni belgilab, AB kesmaning A nuqtasi bo‘yicha sirkul yordamida aylana chizamiz. Sirkulning qalamli uchini B nuqtaga, ignali uchini a to‘g‘ri chizig‘iga qo‘yib aylana chizamiz va C nuqtani belgilaymiz: $AC = 3AB$.

13. a va b uzunlikdagi kesmalar berilgan $(a > b)$. a) $a + b$; b) $a - b$ uzunlikdagi kesmalarni yasang.

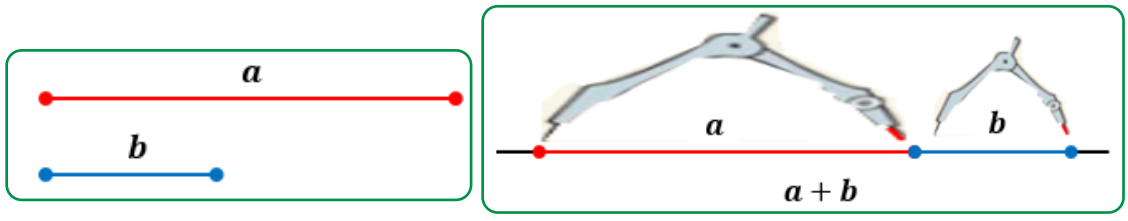




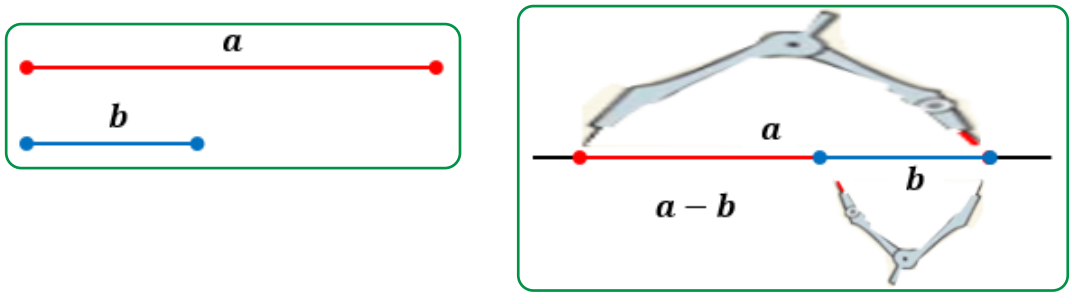
14. Uzunligi $12\ cm$ va $5\ cm$ bo‘lgan kesmalar berilgan. Uzunligi: a) $17\ cm$; b) $7\ cm$; c) $12\ cm$; d) $22\ cm$; e) $29\ cm$ bo‘lgan kesmalarni yasang.

a) $a = 12\ cm;\ b = 5\ cm;\ c = 17\ cm.$

$c = a + b = 12\ cm + 5\ cm = 17\ cm$

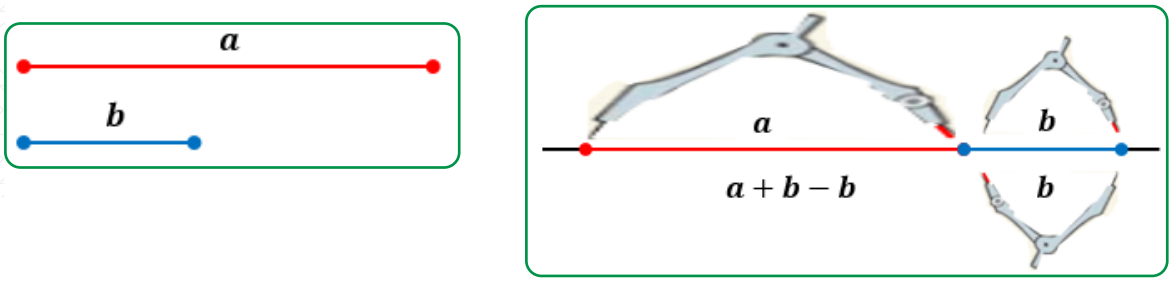


b) $a = 12\ cm;\ \ b = 5\ cm;\ \ c = 7\ cm$
$c = a - b = 12\ cm - 5\ cm = 7\ cm$



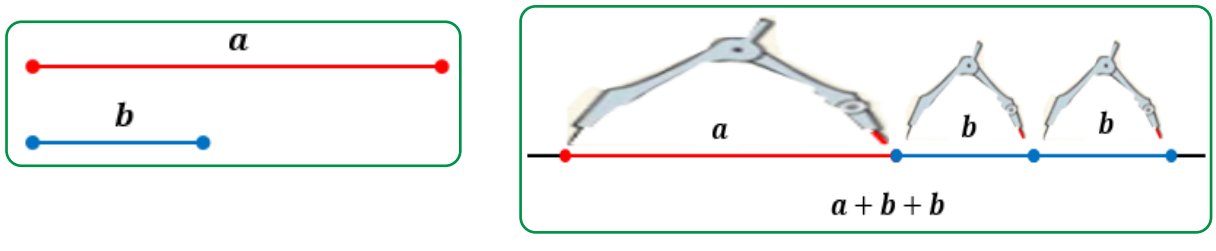
c) $a = 12\ cm;\ \ b = 5\ cm;\ \ c = 12\ cm.$

$c = a + b - b = 12\ cm + 5\ cm - 5\ cm = 12\ cm$

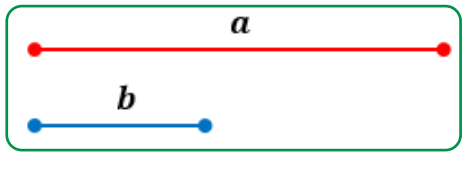


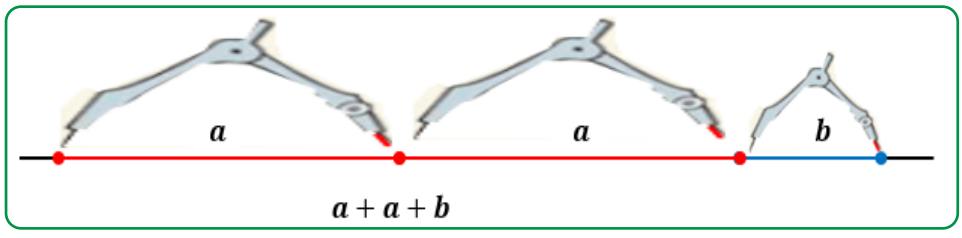
d) $a = 12\ cm;\ \ b = 5\ cm;\ \ c = 22\ cm.$

$c = a + b + b = 12\ cm + 5\ cm + 5\ cm = 22\ cm$

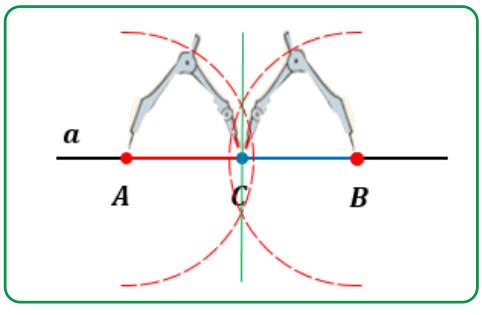


d) $a = 12\ cm;\ \ b = 5\ cm;\ \ c = 29\ cm.$
$c = a + a + b = 12\ cm + 12\ cm + 5\ cm = 29\ cm$





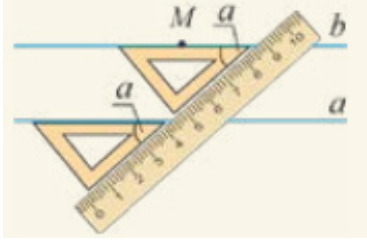
15*. A va B nuqtalardan bir xil uzoqlashgan hamda a to‘g‘ri chiziqda yotuvchi nuqtani toping.



$a \in A;\ a \in B.$ Topish kerak: C.

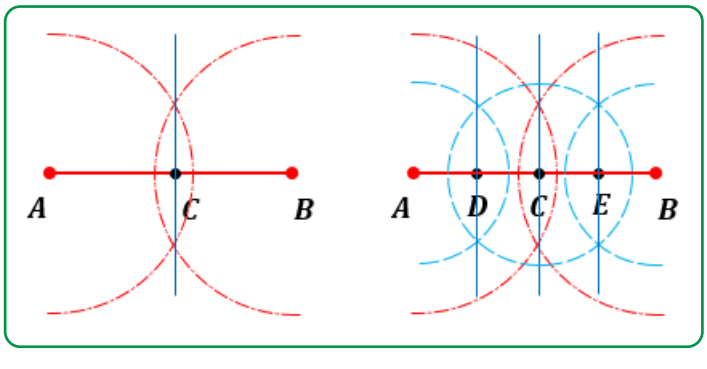
Sirkul oyoqlarini ko‘z bilan chamalab, markaz masofasidan kattaroq ochib, sirkulning ignali uchini A nuqtaga qo‘yib,keyin B nuqtaga qo‘yib aylana chizamiz. Aylanalar kesishgan ikki nuqta orqali to‘g‘ri chiziq o‘tkazib a to‘g‘ri chiziq kesishgan joyini C nuqta bilan belgilaymiz. Natijada $AC = BC$ teng kesmalar hosil bo‘ladi. Demak, C nuqta A va B nuqtalardan bir xil masofada uzoqlashganligi hosil qilinadi.

16. Faqat chizg‘ich yordamida a to‘g‘ri chiziqda yotmaydigan M nuqta orqali a to‘g‘ri chiziqqa parallel bo‘lgan b to‘g‘ri chiziqni o‘tkazing.



Chizg‘ichlardan foydalanib a to‘g‘ri chiziqda yotmaydigan M nuqta orqali a to‘g‘ri chiziqda parallel b to‘g‘ri chiziqni ko‘rsatilgan holatda yasash ishini amalga oshirish mumkin.

17. Berilgan kesmani to‘rtta teng bo‘lakka bo‘ling.

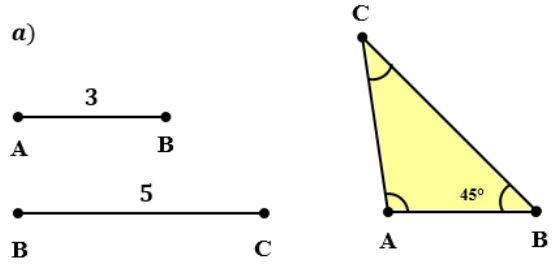


1) AB kesmaning A va B uchlari orqali kesma markazidan katta holatda aylana chizilib, kesishgan nuqtalari orqali to‘g‘ri chiziq chizish bilan C nuqta topiladi.

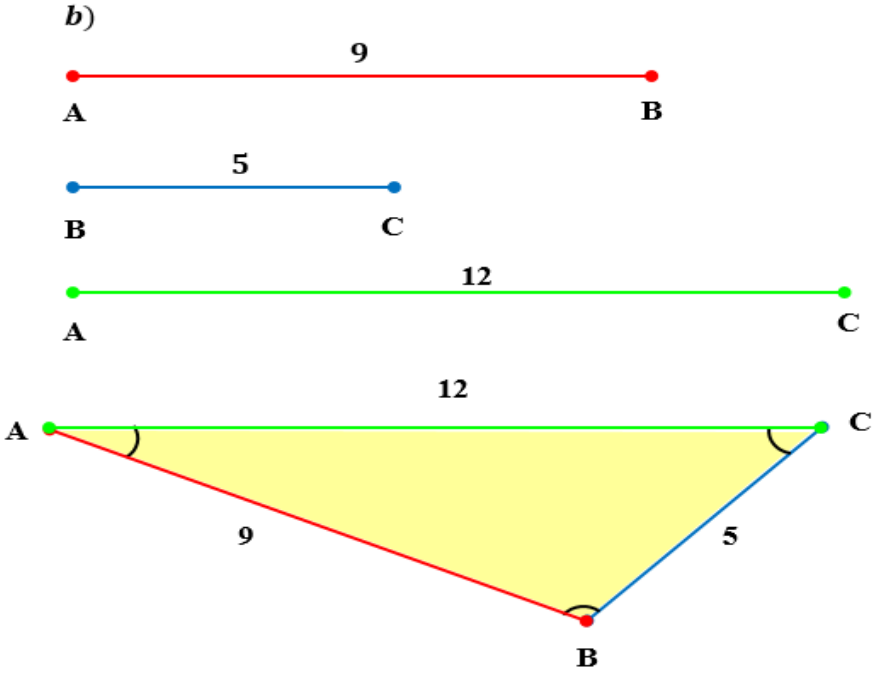
2) Shu bajarilgan ishni takroran AC va BC kesmalarda bajarib, D va E nuqtalar topiladi. Natijada AB kesma to‘rtta teng bo‘lakka bo‘linadi.

18. Quyidavilarga ko‘ra ABC uchburchak yasang: a) $AB = 3;\ BC = 5;\ \angle B = 45°$; b) $AB = 9;\ BC = 5;\ AC = 12$; c) $AB = 22;\ \angle A = 30°;\ \angle B = 56°$.

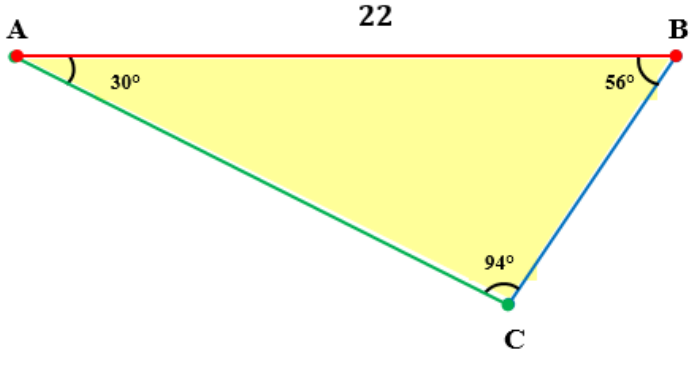
a)



b)

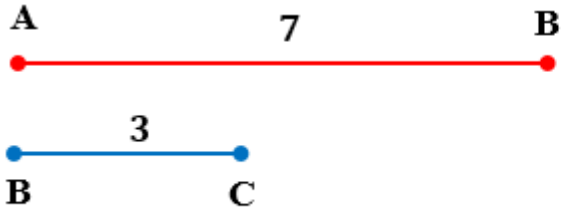


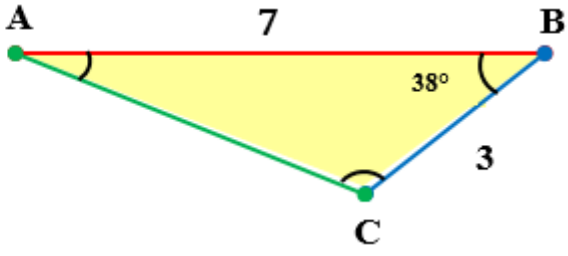
c)



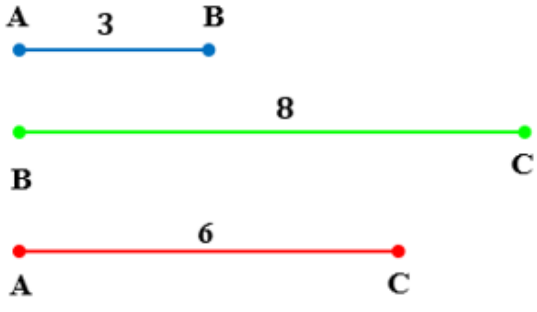
19. Quyidavilarga ko‘ra ABC uchburchak yasang: a) $AB = 7;\ BC = 3;\ \angle B = 38°$; b) $AB = 3;\ BC = 8;\ AC = 6;$ c) $AB = 9;\ \angle A = 90°;\ \angle B = 50°$.

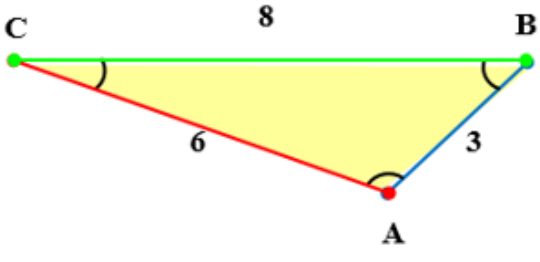
a) $AB = 7;\ BC = 3;\ \angle B = 38°;$



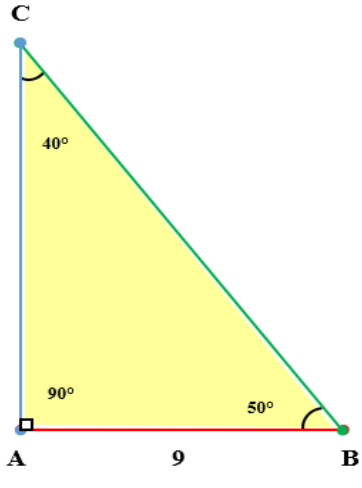


b) $AB = 3;\ BC = 8;\ AC = 6;$





c) $AB = 9;\ \angle A = 90°;\ \angle B = 50°.$



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TAKRORLASHGA DOIR MASALALAR. (2 soat)

1-DARS

I. Standartlar:

M7.GO‘.MM.22. Isbotlashga oid masalalar mohiyatini biladi va sodda hollarda ularni isbotlay oladi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– isbotlashga oid masalalar mohiyatini bilish;
– sodda hollarda ularni isbotlay olish.

Ko‘nikmalar:

– isbotlashga oid masalalar mohiyatini biladi va sodda hollarda ularni isbotlay oladi.

III. Dars mazmunining qisqacha tavsifi:

– geometrik masalalarni yechish bosqichlari;
– geometrik masalalarning turlari.

IV. Dars ashyolari va ko‘rgazmali qurollar:

– chizg‘ich, sirkul, transportir.

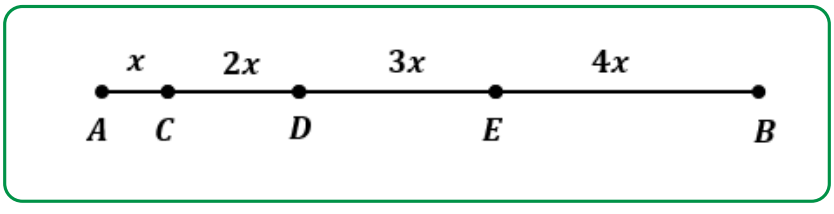
V. Darsning qisqacha texnologik xaritasi:

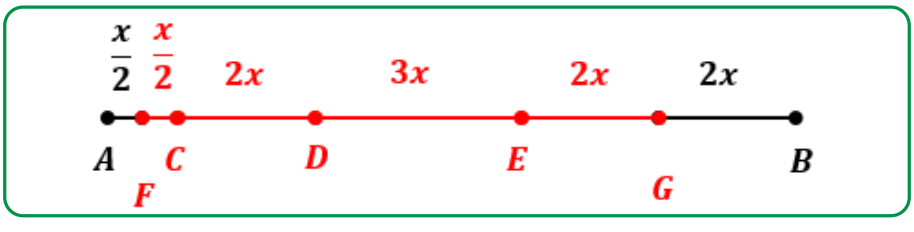
Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Geometrik masalalarni yechishda nimalarga e’tibor berasiz?	“Aqliy hujum”	Geometrik masalaga oid chizmani to‘g‘ri chizish qanchalik ahamiyatga ega?
Bilimlarni boyitish va mustahkamlash	Geometrik masalalarni yechish bosqichlari	Darslikning 168-sahifasidagi 4 ta bosqich bilan ishlash	Amaliy mashq va tatbiq (1, 2, 3)
	Geometrik masalalarning qo‘yilishi va mohiyatiga ko‘ra turlari	Darslikning 168-sahifasidagi 3 ta turi bilan ishlash	Amaliy mashq va tatbiq (4, 5, 6)
Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikdagi 7-, 8-amaliy mashqlarni bajarish

Uyga vazifa	1. Geometrik yasashga doir murakkabroq masalalarni yechishning qanday bosqichlari bor? 2. Darslikdagi 9-, 10-amaliy mashqlarni yechish.

Masalalar, yechimlari va ularga doir ko‘rsatmalar

1. AB kesma uzunliklari 1 : 2 : 3 : 4 kabi nisbatdagi kesmalarga (shu ketma-ketlikda) ajratilgan. Agar chetki kesmalarning o‘rtalari orasidagi masofa 15 cm ga teng bo‘lsa, AB kesmaning uzunligini toping.





Berilgan: $FG = 15\ cm.$ Topish kerak: $AB = ?$

$AC = x;\ CD = 2x;\ DE = 3x;\ EB = 4x;\ AF = FC = \frac{x}{2};\ EG = GB = 2x.$

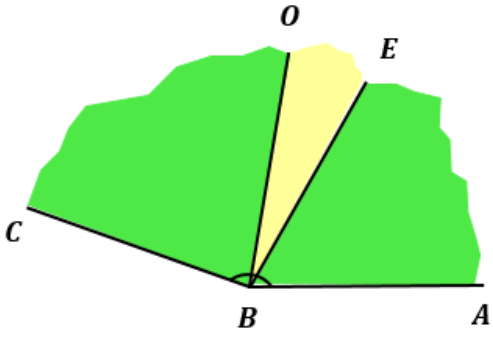
$AB = AC + CD + DE + EB;\ AB = x + 2x + 3x + 4x = 10x;\ AB = 10x;$

$FC + CD + DE + EG = FG;\ \frac{x}{2} + 2x + 3x + 2x = 15\ cm;\ 7{,}5x = 15\ cm;$

$x = \frac{15\ cm}{7{,}5};\ x = 2\ cm;\ AB = 10x = 10 \cdot 2\ cm = 20\ cm.$

Javob: $AB = 20\ cm.$

2. $\angle ABC = 160°$ bo‘lgan burchakning uchidan shu burchak tomonlari orasida yotuvchi BO va BE nurlar chiqarilgan. Agar BO nur berilgan burchakni teng ikkiga, BE nur esa $3{:}5$ kabi nisbatda bo‘lsa, OBE burchakni toping.



Berilgan: $\angle ABC = 160°;\ \frac{\angle ABE}{\angle EBC} = \frac{3}{5}.$

Topish kerak: $\angle OBE = ?$

$\angle ABO = \angle CBO = \frac{\angle ABC}{2} = \frac{160°}{2} = 80°;$

$\angle ABE = 3x;\qquad \angle EBC = 5x;$

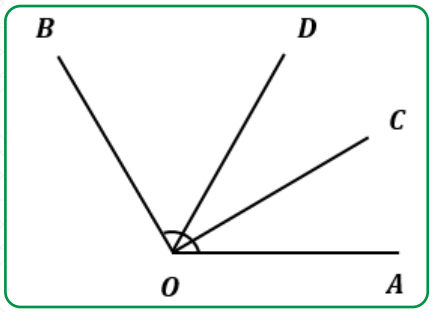
$\angle ABE + \angle EBC = \angle ABC;\quad 3x + 5x = 160°;$

$8x = 160°;\qquad x = \frac{160°}{8};\qquad x = 20°;\qquad \angle ABE = 3x = 3 \cdot 20° = 60°;$

$\angle EBO = \angle ABO - \angle ABE = 80°\text{-}60° = 20°.$

Javob: $\angle EBO = 20°.$

3. AOB burchak OC nur orqali biri ikkinchisidan 30° ga katta bo‘lgan ikkita burchakka ajratilgan. Berilgan burchak bissektrisasi bilan OC nur orasidagi burchakni toping.



$\angle AOC = \alpha;\qquad \angle BOC = \alpha + 30°;$

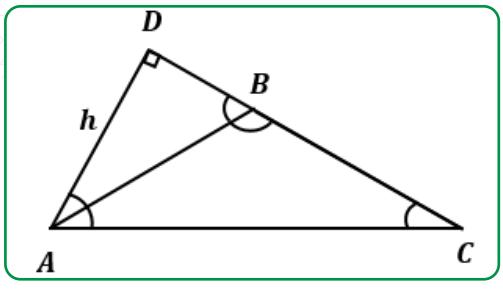
$\angle AOB = 2\alpha + 30°;\qquad \angle BOC = \angle AOC + 30°;$

$\angle AOD = \angle BOD = \frac{\angle AOB}{2} = \frac{2\alpha + 30°}{2} = \alpha + 15°;;$

$\angle DOC = \angle AOD - \angle AOC = \alpha + 15° - \alpha = 15°.$

Javob: $\angle DOC = 15°.$

4. Teng yonli uchburchakning asosidagi burchagi 30^o ga teng. Shu uchburchakning yon tomoni va ikkinchi yon tomoniga tushirilgan balandligi orasidagi burchakni toping.



Berilgan: $\angle BAC = \angle BCA = 30°.$

Topish kerak: $\angle BAD = ?$

$\angle ABC = 180° - 2 \cdot \angle BAC = 180° - 2 \cdot 30° =$

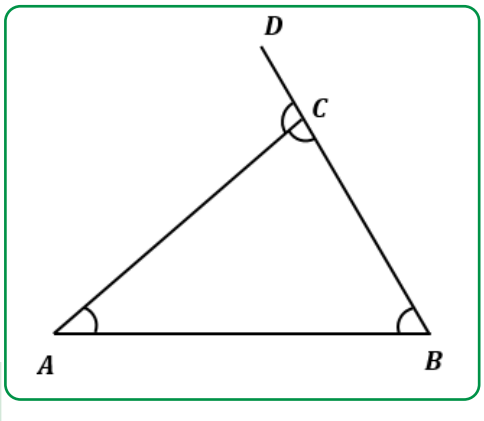
$= 180° - 60° = 120°;$

$\angle ABD = 180° - \angle ABC = 180° - 120° = 60°;$

$\angle D = 90°;\ \angle BAD = 90° - \angle ABD = 90° - 60°$

$= 30°.$ **Javob:** $\angle BAD = 30°.$

5. Uchburchakning bir tashqi burchagi 100°, unga qo‘shni bo‘lmagan burchaklar nisbati 2 : 3 kabi. Uchburchakning burchaklarini toping.



Berilgan: $\angle ACD = 100°;\quad \angle A : \angle B = 2 : 3.$

Topish kerak: $\angle A = ?;\quad \angle B = ?;\quad \angle ACB = ?$

$\angle ACB = 180° - \angle ACD = 180° - 100° = 80°;$

$\angle A = 2x;\quad \angle B = 3x;\quad \angle A + \angle B + \angle ACB = 180°;$

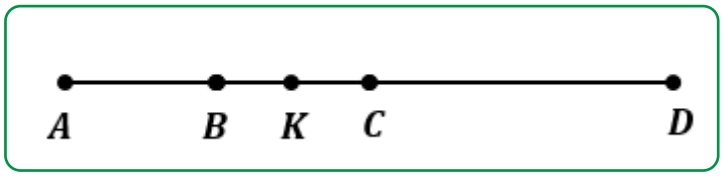
$2x + 3x + 80° = 180°;\quad 5x + 80° = 180°;$

$5x = 180° - 80°;\ \ 5x = 100°;\ \ x = \frac{100°}{5};$

$x = 20°;\ \ \angle A = 2x = 2 \cdot 20° = 40°;\ \ \angle B = 3x = 3 \cdot 20° = 60°.$

Javob: $\angle A = 40°;\ \ \angle B = 60°;\ \ \angle ACB = 80°.$

6. A, B, C, D nuqtalar ko‘rsatilgan tartibda bir to‘g‘ri chiziqda yotadi va $AB = BC = 1, CD = 2$. K nuqta BC kesmada shunday joylashganki, u BC va AD kesmalarni bir xil nisbatdagi bo‘laklarga bo‘ladi: $BK : KC = AK : KD$. Bu nisbatlarni toping.



$AB = BC = 1;\qquad CD = 2;\qquad BK : KC = AK : KD;\qquad \frac{BK}{KC} = ?$

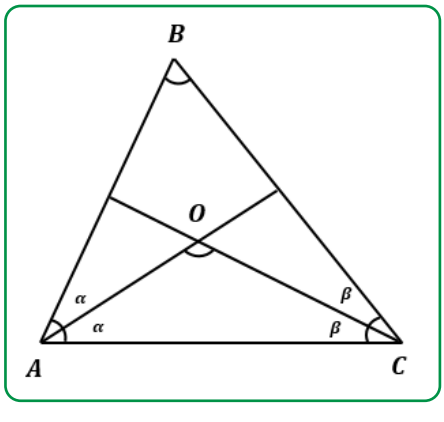
$BK = x;\ \ KC = 1 - x;\ \ AK = 1 + x;\ \ KD = 3 - x;$

$\frac{x}{1-x} = \frac{1+x}{3-x};\qquad x \cdot (3-x) = (1+x) \cdot (1-x);\qquad 3x - x^2 = 1 - x^2;$

$3x = 1;\qquad x = \frac{1}{3};\qquad \frac{BK}{KC} = \frac{x}{1-x} = \frac{\frac{1}{3}}{1-\frac{1}{3}} = \frac{\frac{1}{3}}{\frac{2}{3}} = \frac{1}{3} \cdot \frac{3}{2} = \frac{3}{6} = \frac{1}{2};$

Javob: $\frac{BK}{KC} = \frac{1}{2}.$

7. Uchburchak ikkita burchagining bissektrisalari kesishgandan hosil bo‘lgan burchak 128° ga teng.Uchburchakning uchinchi burchagini toping.



Berilgan: $\angle AOC = 128°$. Topish kerak: $\angle B = ?$

ΔABC da $\angle OAC + \angle OCA + \angle AOC = 180°;$

$\alpha + \beta + 128° = 180°;\quad \alpha + \beta = 180° - 128°;$

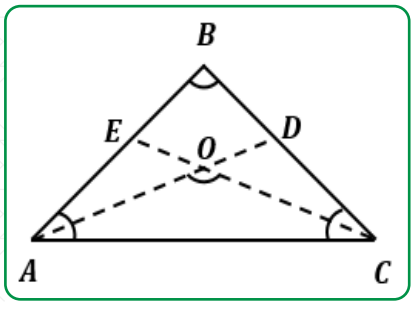
$\alpha + \beta = 52°;$ ΔABC da $\quad \angle A + \angle C + \angle B = 180°;$

$2\alpha + 2\beta + \angle B = 180°;\quad \angle B = 180° - 2(\alpha+\beta) =$

$= 180° - 2 \cdot 52° = 180° - 104° = 76°.$

Javob: $\angle B = 76°.$

8. Teng yonli uchburchakning uchidagi burchagi 96° ga teng. Asosidagi burchaklarning bissektrisalari kesishishidan hosil bo‘lgan o‘tkir burchakni toping.



Berilgan: $AB = BC;\ \angle B = 96°.\ \angle AOE = ?$

$$\angle A = \angle C = \frac{180° - \angle B}{2} = \frac{180° - 96°}{2} = \frac{84°}{2} = 42°;$$

$$\angle OAC = \angle OCA = \frac{\angle A}{2} = \frac{42°}{2} = 21°;$$

$$\angle AOC = 180° - 2 \cdot \angle OAC = 180° - 2 \cdot 21° = 180° - 42° = 138°;$$

$$\angle AOE = 180° - \angle AOC = 180° - 138° = 42°.$$

Javob: $\angle AOE = 42°$.

2-DARS

I. Standartlar:

M7.GO‘.MM.22. Isbotlashga oid masalalar mohiyatini biladi va sodda hollarda ularni isbotlay oladi.

II. Dars maqsadi. O‘quvchilarda quyidagi bilim va ko‘nikmalarni shakllantirish:

Bilim:

– isbotlashga oid masalalar mohiyatini bilish;
– sodda hollarda ularni isbotlay olish.

Ko‘nikmalar:

– isbotlashga oid masalalar mohiyatini biladi va sodda hollarda ularni isbotlay oladi.

III. Dars mazmunining qisqacha tavsifi:

– hisoblashga doir masalalar;
– isbotlashga doir masalalar.

IV. Dars ashyolari va ko‘rgazmali qurollar:

– chizg‘ich, sirkul, transportir.

V. Darsning qisqacha texnologik xaritasi:

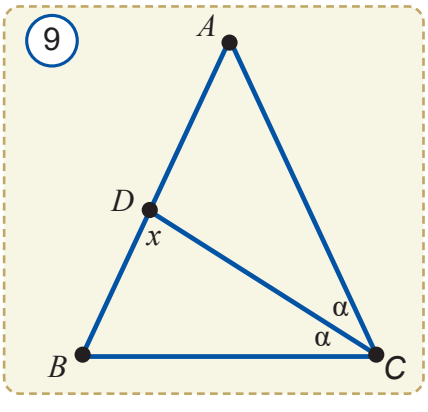
Dars bosqichlari	Tafsilotlar	Uslubiy tavsiyalar	Savollar va yechiladigan masalalar
Motivatsiya	Masalani tushunish bosqichida qanday ish bajariladi?	“Aqliy hujum”	Geometrik masalaga oid chizmani to‘g‘ri chizish qanchalik ahamiyatga ega?

Bilimlarni boyitish va mustahkamlash	Hisoblashga doir masalalar	Darslikning 170-sahifasidagi 3-, 4-, 5-rasmlar bilan ishlash	Amaliy mashq va tatbiq (11,12)
	Isbotlashga doir masalalar	Darslikning 171-sahifasidagi 6-, 7-rasmlar bilan ishlash	Amaliy mashq va tatbiq (13, 14)
Darsga yakun yasash	Bugun nimani o‘rgandik?	Savol-javob	Darslikdagi 15-, 16-amaliy mashqlarni bajarish
	1. Geometrik yasashga doir murakkabroq masalalarni yechishning qanday bosqichlari bor? 2. Darslikdagi 17-19-amaliy mashqlarni yechish.		

Masalalar, yechimlari va ularga doir ko‘rsatmalar

1. Agar 9-rasmda $AB–AC$, $AD–DC$ bo‘lsa, x ni toping.

9



Berilgan: $AB = AC;\ \ AD = DC.$

Topish kerak: $x = ?$

$AB = BC$ bo‘lgani uchun $\angle B = \angle C = 2\alpha$;

$AD = DC$ bo‘lgani uchun $\angle A = \angle ACD = \alpha;$

ΔABC da $\angle A + \angle B + \angle C = 180°;$

$\alpha + 2\alpha + 2\alpha = 180°;\ \ 5\alpha = 180°;\ \ \alpha = 180° : 5;$

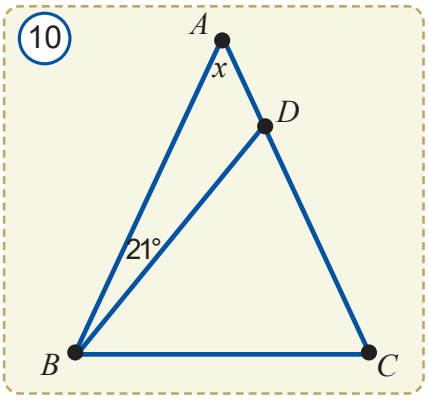
$\alpha = 36°;$

$x = \angle A + \angle ACD = \alpha + \alpha = 2\alpha = 2 \cdot 36° = 72°$.

Javob: $x = 72°$.

2. Agar 10-rasmda $AB - AC$, $BD - BC$ bo‘lsa, x ni toping.

10



Berilgan: $\angle ABD = 21°;\ AB = AC;\ BD = BC.\ \ x = ?$

$\angle B = \angle C = x + 21°;\ \ \angle C = \angle BDC = x + 21°;$

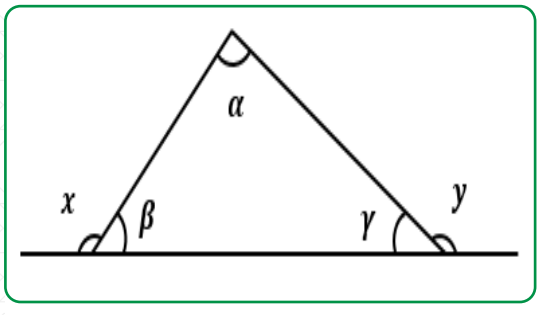
$\angle A + \angle B + \angle C = 180°;$

$x + x + 21° + x + 21° = 180°;\ \ 3x + 42° = 180°;$

$3x = 180° - 42°;\ \ 3x = 138°;\ \ x = 46°.$

Javob: $x = 46°$.

3. Uchburchakning bir burchagi o‘ziga qo‘shni bo‘lmagan tashqi burchaklarning ayirmasiga teng. Bu uchburchakning to‘g‘ri burchakli uchburchak ekanligini isbotlang.



$x + \beta = 180°;\ x = 180° - \beta;$

$y + \gamma = 180°;\ y = 180° - \gamma;$

$\alpha = y - x = 180° - \gamma - 180° + \beta = \beta - \gamma;$

$\alpha = \beta - \gamma;\ \alpha + \gamma = \beta;$

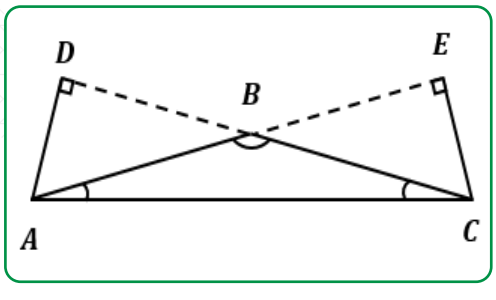
$\alpha + \beta + \gamma = 180°;\ \alpha + \gamma + \beta = 180°;$

$\beta + \beta = 180°;\ 2\beta = 180°;$

$$\beta = \frac{180°}{2};\qquad \beta = 90°.$$

Javob: To‘g‘ri burchakli uchburchak $\beta = 90°$.

4. Bir burchagi 150° bo‘lgan teng yonli uchburchakning asosidagi uchlaridan tushirilgan balandliklari teng bo‘lishini isbotlang.



Berilgan: $AB = BC;\quad \angle B = 150°.$

Isbotlash kerak: $AD = CE.$

$$\angle BAC = \angle BCA = \frac{180° - \angle B}{2} = \frac{180° - 150°}{2} =$$

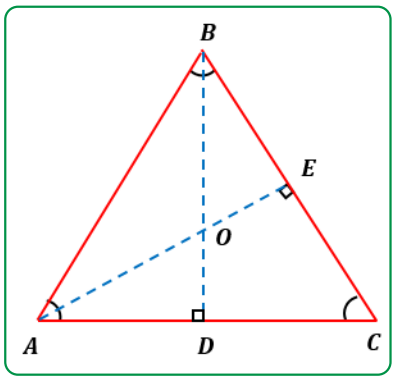
$$= \frac{30°}{2} = 15°;$$

$\angle DAC = \angle ECA = 90° - \angle BAC = 90° - 15° = 75°;$

$$\begin{cases} \angle DAC = \angle ECA = 75° \\ \angle ACD = \angle EAC = 15° \\ AC - umumiy\ tomon \end{cases} \rightarrow \quad BTB\ alomatiga\ ko‘ra\ \Delta ADC = \Delta CEA.$$

Bundan, $AD = CE$ kelib chiqadi. Isbotlandi.

5. Teng tomonli uchburchakning medianalari kesishish nuqtasida 2:1 nisbatda bo‘linishini isbotlang.



Berilgan: $AB = BC = AC;$

$$\angle A = \angle B = \angle C = \frac{180^\circ}{3} = 60^\circ;$$

$$\begin{cases} AD = DC \\ AB = BC \\ BD - umumiy \end{cases} \quad TTT\ alomatiga\ ko'ra,$$

$$\Delta ABD = \Delta BDC.$$

Demak, $\angle ABD = \angle CBD = \frac{60^\circ}{2} = 30^\circ;$ $\angle ADB = \angle CDB = 90^\circ;$

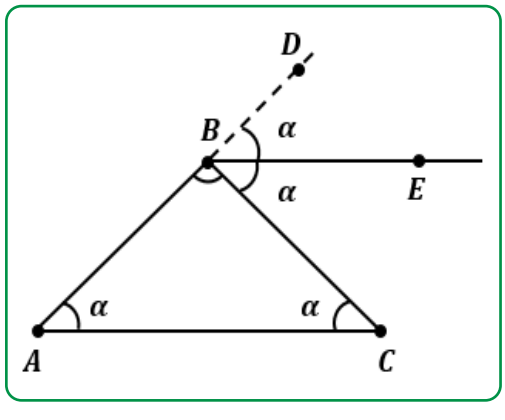
Xuddi shunday, $\angle BAE = \angle CAE = 30^\circ$ va $BD = AE$ ham kelib chiqadi.

$\angle ABO = \angle BAO = 30^\circ;\ AO = BO;\ \angle AOD = \angle ABO + \angle BAO = 60^\circ;$

$\angle DAO = 90^\circ - 60^\circ = 30^\circ.$ ΔADO da $\begin{cases} OD = \frac{AO}{2} \\ AO = OB \end{cases} \rightarrow \begin{cases} AO = 2 \cdot OD \\ AO = OB \end{cases} \rightarrow$

$$\rightarrow \frac{BO}{OD} = \frac{AO}{OD} = \frac{2 \cdot OD}{OD} = \frac{2}{1}. \qquad \frac{BO}{OD} = \frac{2}{1}$$ Isbot bo'ldi.

16. Teng yonli uchburchakning uchidagi tashqi burchagi bissektrisasi uchburchak asosiga parallel bo'lishini isbotlang.



$AB = BC \rightarrow \angle A = \angle C = \alpha$

$\angle CBD = \angle A + \angle C = \alpha + \alpha = 2\alpha$

$$\angle CBE = \angle EBD = \frac{\angle CBD}{2} = \frac{2\alpha}{2} = \alpha$$

$\angle C = \angle CBE$ ichki almashinuvchi burchak

Demak, $AC \parallel BF$ isbot bo'ldi.

O‘quv nashri

GEOMETRIYA
7

O‘QITUVCHILAR UCHUN METODIK QO‘LLANMA

Muharrir – Ilhom Qosimov
Badiiy muharrir – Sarvar Farmonov
Texnik muharrir – Akmal Sulaymonov
Musahhih – Mansur Siddiqov
Sahifalovchi va dizayner – Ixvoldin Salohitdinov

Original-maketdan bosishga ruxsat etildi __.__.2022. Bichimi 70x90 1/16. “Arial” garniturasi. Ofset bosma usulda bosildi. Shartli bosma tabog‘i 14,0. Nashr bosma tabog‘i 13,0. Nusxasi _____. Buyurtma №_____.

Shartnoma №___.