GEOMETRIYAGA DOIR AYRIM QIZIQARLI MASALALAR YECHIMLARIDAN NAMUNALAR

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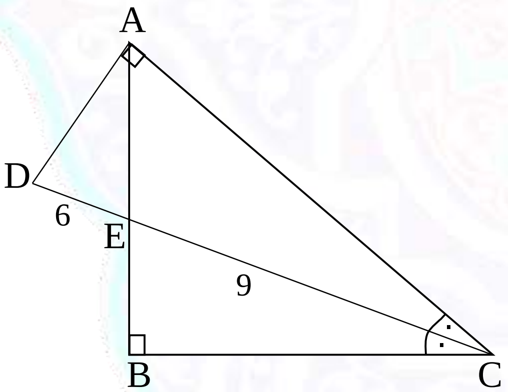
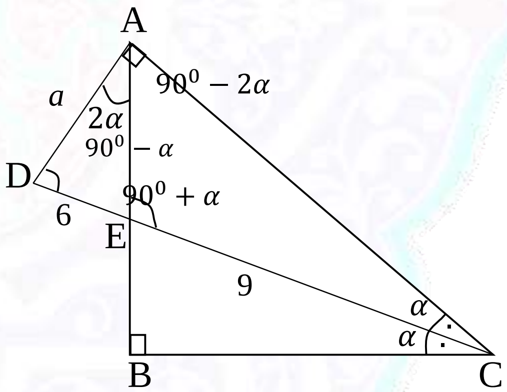
Annotatsiya:*Ushbu maqolada Milliy sertifikat imtihonlarida matematika(geometriya) fanidan tushayotgan ayrim masalalarni yechish usullari bayon qilingan.*

Kalit so'zlar: *uchburchak, to'g'ri burchakli uchburchak, kvadrat, to'g'ri to'rtburchak, trapetsiya, Pifagor teoremasi, o'xshashlik.*

Milliy sertifikat imtihonlaridagi geometriyaga doir masalalar ko'pchilikni qiynab qo'ymoqda. Ushbu maqola orqali ayrim masalalar yechimlaridan namunalar keltiramiz va matematika fanidan milliy sertifikat imtihonlariga tayyorlanayotganlarga biroz bo'lsada yordamimiz tegsa, maqsadimizga erishgan bo'lamiz.

1-masala. Chizmadagi ma'lumotlar asosida ADC uchburchak yuzasini toping.





ΔADC **dan** $sin\alpha = \frac{a}{15}$ **(1)**

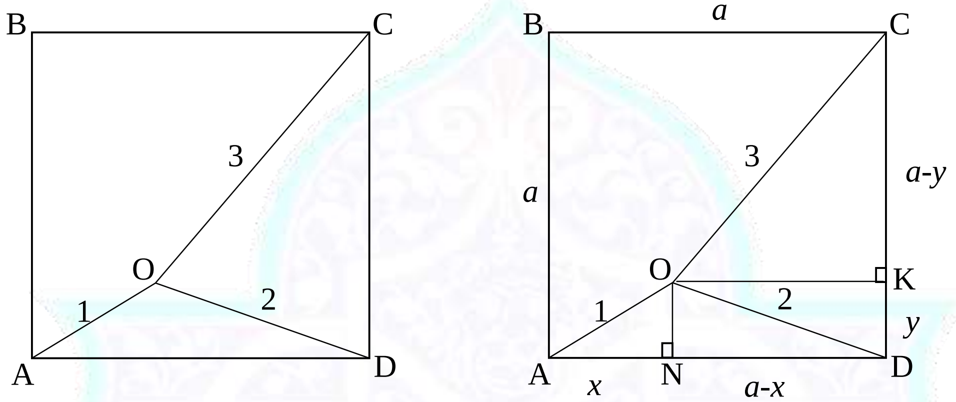
ΔADE **dan** $\frac{a}{\sin(90^0-\alpha)} = \frac{6}{sin2\alpha} \rightarrow \quad \frac{a}{cos\alpha} = \frac{6}{2sin\alpha cos\alpha} \rightarrow \quad sin\alpha = \frac{3}{a}$ **(2)**

(1) va (2) dan $\frac{a}{15} = \frac{3}{a} \rightarrow a = 3\sqrt{5}$

ΔADC **dan** $AC = \sqrt{DC^2 - AD^2} = \sqrt{15^2 - (3\sqrt{5})^2} = 6\sqrt{5} \rightarrow$

$S = \frac{1}{2}AD \cdot AC = \frac{1}{2} \cdot 3\sqrt{5} \cdot 6\sqrt{5} = 45$.

2-masala. $ABCD$ kvadrat uchun berilgan ma'lumotlardan foydalanib, uning yuzini va $\angle AOD$ ni toping.

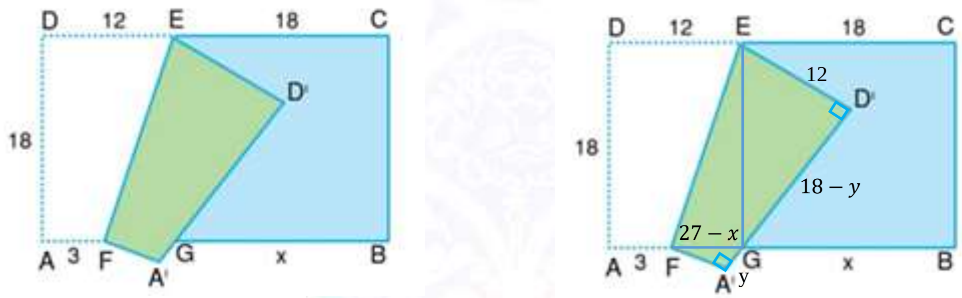


ΔAON va ΔODN dan $y^2 = 1 - x^2$ va $y^2 = 2^2 - (a-x)^2 \rightarrow x = \frac{a^2-3}{2a}$ (1)
ΔDOK va ΔCOK dan $(a-x)^2 = 2^2 - y^2$ va $(a-x)^2 = 3^2 - (a-y)^2 \rightarrow$ $y = \frac{a^2-5}{2a}$ (2)
ΔAON dan $y^2 + x^2 = 1$ tenglikka (1) va (2) qiymatlarni keltirib qo'yib,

$$\left(\frac{a^2-5}{2a}\right)^2 + \left(\frac{a^2-3}{2a}\right)^2 = 1$$

tenglamaga ega bo'lamiz. Bu tenglamani yechib, $a^2 = 5 + 2\sqrt{2}$ qiymatga ega bo'lamiz. Bu qiymat kvadrat yuzini ifodalaydi.
$\angle AOD$ ni aniqlash uchun ΔAOD ga kosinuslar teoremasini qo'llaymiz: $a^2 = 1^2 + 2^2 - 2\cdot 1\cdot 2\cdot cos\angle AOD$ yoki $a^2 = 5 + 2\sqrt{2}$ ekanligidan $cos\angle AOD = -\frac{\sqrt{2}}{2} \rightarrow \angle AOD = 135^0$

3-masala. Rasmda **tasvirlangan $ABCD$ to'g'ri to'rtburchakning AD tomoni EF kesma bo'yicha buklanganda, A nuqtasi A' nuqtaga, D nuqtasi D' nuqtaga ko'chdi. BG kesma uzunligini toping.**



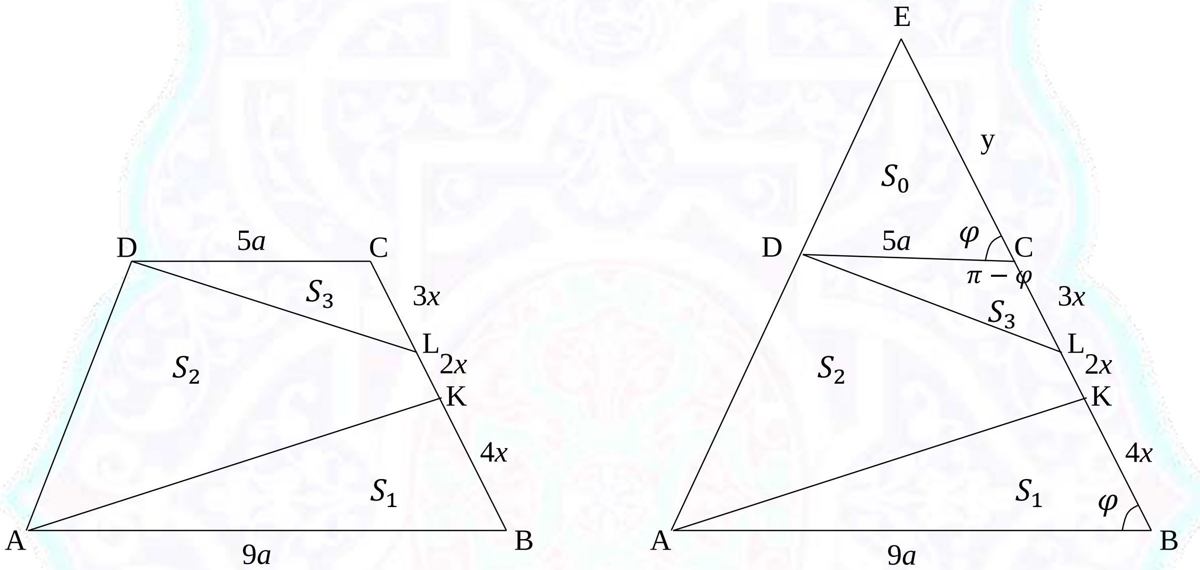
Masalani yechish uchun $AFED$ va $FA'D'E$ to'rtburchaklar (to'g'ri burchakli trapetsiyalar) yuzalari tengligidan foydalanamiz, ya'ni

$$S_{AFED} = S_{FA'G} + S_{FGE} + S_{EGD'} \rightarrow \frac{12+3}{2}\cdot 18 = \frac{3y}{2} + \frac{(27-x)\cdot 18}{2} + \frac{12\cdot(18-y)}{2} \rightarrow$$

$y = 48 - 2x$ **(1)**

$\Delta FA'G$ **dan Pifagor teoremasiga ko'ra** $3^2 + y^2 = (27 - x)^2$ **(2) ga ega bo'lamiz. (1) ni (2) ga qo'yib,** $3^2 + (48 - 2x)^2 = (27 - x)^2$ **tenglamaga, bundan esa** $x = 22$ **qiymatga ega bo'lamiz.**

4-masala. Yuzasi 42 ga teng bo'lgan trapetsiyaning asoslari $AB:DC = 9:5$ nisbatda, hamda BC yon tomonidan olingan K **va** L **nuqtalar uchun** $9BK = 4BC = 12CL$ **(*K* nuqta *B* uchga, *L* nuqta *C* uchga yaqin) munosabatlar o'rinli bo'lsa,** DL **va** AK **kesmalar trapetsiyadan ajratgan bo'laklar yuzalarini toping.**



Yechish. Masala sharti bo'yicha S_1, S_2, S_3 **yuzalarni topishimiz kerak. Buning uchun dastlab trapetsiyani uchburchakka to'ldirib olamiz. Natijada hosil qilingan** DEC **va** AEB **uchburchaklar o'xshash bo'ladi. Bunga ko'ra** $\frac{y}{y+9x} = \frac{5a}{9a} \rightarrow$ $\frac{x}{y} = \frac{4}{45}$ **(*), shuningdek,** $\frac{S_0}{S_0+42} = \left(\frac{5a}{9a}\right)^2 \rightarrow S_0 = \frac{75}{4}$ **(**). Undan tashqari ikki tomon va ular orasidagi burchak sinusi orqali uchburchak yuzasini hisoblash formulasiga ko'ra quyidagilarni yoza olamiz:**

$\frac{S_3}{S_0} = \frac{\frac{1}{2} \cdot 5a \cdot 3x \cdot \sin(\pi - \varphi)}{\frac{1}{2} \cdot 5a \cdot y \cdot \sin\varphi} = 3 \cdot \frac{x}{y}$ **bunda (*)ni e'tiborga olsak,** $\frac{S_3}{S_0} = 3 \cdot \frac{x}{y} = 3 \cdot \frac{4}{45} = \frac{4}{15} \rightarrow$

(**) ni e'tiborga olsak, $S_3 = \frac{4}{15} \cdot S_0 = \frac{4}{15} \cdot \frac{75}{4} = 5 \rightarrow S_3 = 5$ **;**

$\frac{S_3}{S_1} = \frac{\frac{1}{2} \cdot 5a \cdot 3x \cdot \sin(\pi - \varphi)}{\frac{1}{2} \cdot 9a \cdot 4x \cdot \sin\varphi} = \frac{5}{12}$**,** $S_3 = 5$ **ekanligidan** $S_1 = 12$ **ga ega bo'lamiz.**

$$S_2 = S_t - (S_1 + S_3) = 42 - (12 + 5) = 25$$

Javob: $S_1 = 12, \ S_2 = 25, \ S_3 = 5$

XULOSA

O‘quvchilar maqolada keltirilgan masalalar haqidagi fikr mulohazalar, hamda ularni yechish usullaridan foydalanib shu mavzuga oid masalalarni yechish bilim va ko‘nikmasiga ega bo‘ladilar.

FOYDALANILGAN ADABIYOTLAR RO‘YXATI

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