



TESTLARNI YECHISHNING MAXSUS USULLARI

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Annotation: Maqolada geometriyaning ikki qismi ya'ni planimetriya va stereometriya alohida-alohida paragrafga bo'lib o'rganilgan va tajribalar natijasida bir nechta testlarni yechishning maxsus usullari keltirilgan. Shuningdek maqolada test yechish ko'nikmasini shakllantirish, mantiqiy fikrlash, testlarga alohida yondashish va mushohada yuritish yo'li bilan yechish usullari ko'rsatilgan.

Key words: to'g'ri burchakli uchburchak, ichki chizilgan aylana, gipotenuza, aylana, aylana markazi, vatar, teng yonli trapetsiya, uchburchak perimetri, uchburchak bissektrisasi, konus, konus asosining yuzi, konus o'q kesimining yuzi.

Tekislikdagi jismlar ustida qo'yilgan testlarni yechishning maxsus usullari

1. Aylana markazidan turli tomonda uzunliklari 36 va 48 ga teng bo'lgan parallel vatarlar o'tkazilgan. Ular orasidagi masofa 42 ga teng bo'lsa aylananing radiusini toping?



A)30 B)28 C)32 D)26 E)34

Yechilishi: Shaklda A, B va C, D nuqtalarni o'zaro tutashtirib, aylanaga ichki chizilgan teng yonli trapetsiyani hosil qilamiz. Binobarin:
 $AE = 42, ED = 6, AE = CE, \angle A = \angle ACE = 45^\circ$

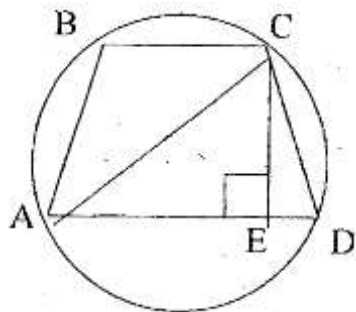
Pifagor teoremasiga asosan: $CD^2 = CE^2 + ED^2$

$$CD = \sqrt{42^2 + 6^2} = \sqrt{1764 + 36} = \sqrt{1800} = 30\sqrt{2}$$

Tashqi chizilgan aylananing radiusi esa:

$$R = \frac{CD}{2 \sin \angle A} = \frac{30\sqrt{2}}{2 \sin 45^\circ} = \frac{30\sqrt{2}}{2 \cdot \frac{\sqrt{2}}{2}} = 30$$

Demak, to'g'ri javob: A)30



1-chizma. Aylanaga ichki chizilgan trapetsiya.

2. To'g'ri burchakli uchburchakka ichki chizilgan aylananing markazidan gipotenuza uchlarigacha bo'lgan masofalar $\sqrt{5}$ va $\sqrt{10}$ ga teng. Gipotenuzaning uzunligini toping?

A)5 B) $\frac{1}{2} \cdot \sqrt{50}$ C) $\sqrt{50}$ D)6 E)5.2



Yechilishi: Bizga ma'lumki, uchburchakka ichki chizilgan aylananing markazi uchburchak bissektrisalarining kesishish nuqtasidan iborat. Shuning uchun shaklga asosan $2\alpha + 2\beta = 90^\circ, \alpha + \beta = 45^\circ$

$$\angle AIC = 180^\circ - (\alpha + \beta) = 180^\circ - 45^\circ = 135^\circ$$

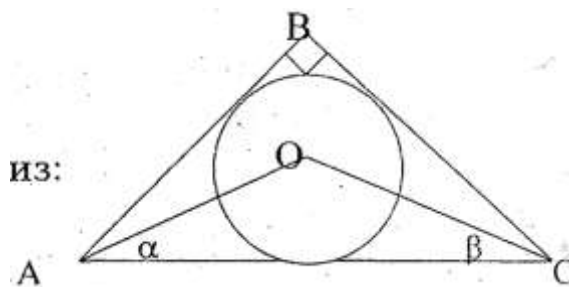
Kosinuslar teoremasiga asosan topamiz:

$$AC^2 = OA^2 + OC^2 - 2 \cdot OA \cdot OC \cdot \cos \angle AOC$$

$$AC^2 = (\sqrt{5})^2 + (\sqrt{10})^2 - 2 \cdot \sqrt{5} \cdot \sqrt{10} \cdot \cos 135^\circ =$$

$$= 5 + 10 - 2 \cdot \sqrt{50} \left(-\frac{\sqrt{2}}{2} \right) = 10 + 15 = 25 \Rightarrow AC = 5$$

Binobarin, to'g'ri javob: A)5



2-chizma. Uchburchakka ichki chizilgan aylana.

3. ABC uchburchakka ichki chizilgan aylanaga o'tkazilgan urinma BC va AC tomonlarni mos ravishda A_1 va B_1 nuqtalarda kesib o'tadi. Agar $BC = 5, AC = 6, AB = 7$ bo'lsa, A_1B_1C uchburchakning perimetrini toping?

A)4 B)5 C)3 D)6 E)4,8

Yechilishi: Shaklga asosan: $BA_1 = BC - A_1C$, $AB_1 = AC - B_1C = 6 - B_1C$

Tortburchakka ichki chizilgan aylana xossasidan:



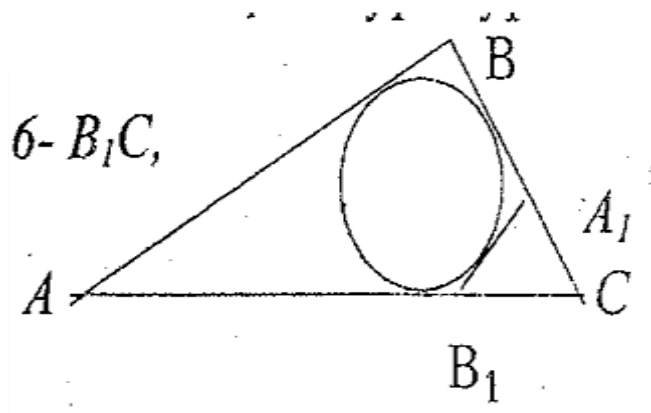
$$AB + A_1B_1 = BA_1 + AB_1 \text{ yoki}$$

$$7 + A_1B_1 = 5 - A_1C + 6 - B_1C$$

$$A_1B_1 + A_1C + B_1C = 11 - 7 = 4$$

$$\text{Demak, } P_{\Delta A_1B_1C} = A_1B_1 + A_1C + B_1C = 4$$

To'g'ri javob: A) 4



3-chizma Uchburchakka ichki chizilgan aylana.

4. Radiuslari 6 va 2 sm bo'lgan aylanalar tashqi tomondan urinadi. Aylanalarning urinish nuqtasidan ularning umumiy urinmalarigacha bo'lgan masofani (sm) aniqlang.

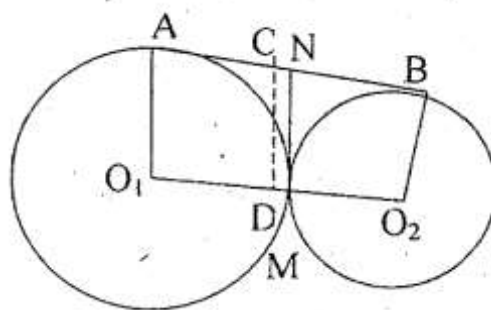
A) 3 B) 2 C) 4 D) 2.5 E) 3.5

Yechilishi: Shaklga ko'ra: O_1ABO_2 to'g'ri burchakli trapetsiya CD – o'rta chiziq MN esa CDO_2B trapetsiyaning o'rta chizig'i:

$$CD = \frac{O_1A + O_2B}{2} = \frac{6 + 2}{2} = 4$$

$$MN = \frac{CD + O_2B}{2} = \frac{4 + 2}{2} = 3$$

Demak, to'g'ri javob: A) 3



4-chizma. Urinuvchi aylanalar.

5. ABC uchburchakda $\angle A = 32^\circ, \angle C = 24^\circ$ Markazi B nuqtada bo'lgan aylana A nuqtadan o'tib AC tomonni M nuqtada, BC tomonni N nuqtada kesib o'tadi. ANM burchakni toping.

- A) 58° B) 62° C) 59° D) 60° E) 61°

Yechilishi: Shaklga ko'ra quyidagilarni topamiz:

$$\angle A = 32^\circ, \angle C = 24^\circ$$

$$\angle B = 180^\circ - (\angle A + \angle C) = 180^\circ - (32^\circ + 24^\circ) = 180^\circ - 56^\circ = 124^\circ$$

$$\angle B = \angle AN$$

$$2\alpha + 124^\circ = 180^\circ; 2\alpha = 56^\circ \Rightarrow \alpha = 28^\circ$$

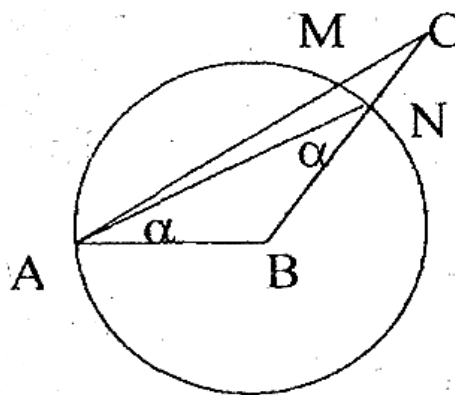
$$\angle MAN = \angle A - \alpha = 32^\circ - 28^\circ = 4^\circ$$

$$\angle MAN = \frac{1}{2} \angle MN \Rightarrow \angle MN = 8^\circ$$

$$\angle AM = \angle AN - \angle MN = 124^\circ - 8^\circ = 116^\circ$$

$$\angle ANM = \frac{1}{2} \angle AM = \frac{1}{2} \cdot 116 = 58^\circ$$

Demak to'g'ri javob: A) 58°



5-chizma. Aylanani kesib o'tgan uchburchak.



Stereometriyaga oid testlarni yechishning maxsus usullari

6. Agar konus asosining yuzi M o'q kesimining yuzi N ga teng bo'lsa, konus yon sirtining yuzini toping.

A) $\sqrt{M^2 + N^2 \pi^2}$ B) $\sqrt{MN}$ C) $\sqrt{\pi MN}$ D) $2\sqrt{MN}$ E) πMN

Yechilishi: Berilganlardan quyidagilarni topamiz:

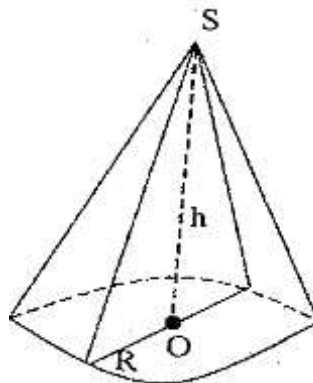
$$S_{as} = \pi R^2 = M \Rightarrow \sqrt{\frac{M}{\pi}}$$

$$\text{Kesim yuzi: } S = \frac{1}{2} 2Rh \Rightarrow Rh = N$$

$$h = \frac{N}{R} = \sqrt{\frac{\pi}{M}} N$$

$$\text{Pifagor teoremasiga ko'ra: } l = \sqrt{R^2 + h^2}$$

$$\text{bundan, } l = \sqrt{\frac{M}{\pi} + \frac{\pi}{M} N^2} = \sqrt{\frac{M^2 + \pi^2 N^2}{\pi M}}$$



6-chizma. Konus tasviri.

$$\text{Demak, } S_{yon} = \pi R l = \pi \sqrt{\frac{M}{\pi}} \cdot \sqrt{\frac{M^2 + \pi^2 N^2}{\pi M}} = \sqrt{M^2 + \pi^2 N^2}$$



Binobarin, to'g'ri javob: A) $\sqrt{M^2 + N^2 \pi^2}$

7. Muntazam to'rtburchakli piramidaning balandligi 8 ga, asosining 12 ga teng. Piramida yon yog'iga parallel bo'lib, asosining markazi orqali o'tgan kesimi yuzini hisoblang.

A) 45 B) 60 C) 72 D) 30 E) 50

Yechilishi: Shaklga ko'ra kesim $A_1B_1C_1D_1$ teng yonli trapetsiyadan iborat. C_1D_1 –kesma uchburchak CSD ning o'rta chizig'i

OE -kesma esa uchburchak SMN ning o'rta chizig'i

$$OS = 8; A_1B_1 = 12; C_1D_1 = \frac{1}{2} A_1B_1 = 6; OE = \frac{1}{2} MS$$

Pifagor teoremasiga asosan:

$$MS = \sqrt{OS^2 + MO^2} = \sqrt{8^2 + 6^2} = \sqrt{64 + 36} = 10$$

$$OE = 5 \Rightarrow S_{A_1B_1C_1D_1} = \frac{A_1B_1 + C_1D_1}{2} \cdot OE = \frac{12 + 6}{2} \cdot 5 = 9 \cdot 5 = 45$$

Demak, to'g'ri javob: A) 45

8. Kesik piramida asoslarining tuzlari 96 va 24 ga, unga mos keluvchi butun o'ramidaning balandligi 16 ga teng. Kesik piramidaning hajmini toping.

A) 448 B) 436 C) 472 D) 384 E) 424

Yechilishi: Ma'lumki, kesik piramidaning hajmi

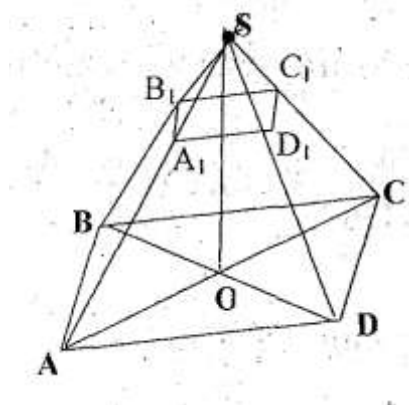
$$V = \frac{1}{3} (S_1 + S_2 + \sqrt{S_1 \cdot S_2}) h \text{ formula yordamida hisoblanadi.}$$

Shaklga asosan: $S_1 = 96; S_2 = 24; OS = 16$



$$\left(\frac{OO_1}{OS}\right)^2 = \frac{S_2}{S_1} \text{ Bundan } \left(\frac{h}{16}\right)^2 = \frac{24}{96} \Rightarrow \frac{h}{16} = \frac{1}{2} \Rightarrow h = 8$$

Demak:



8-chizma. Kesik piramida

$$S = \frac{1}{2}(96 + 24 + \sqrt{96 \cdot 24}) \cdot 8 =$$

$$= \frac{8}{3}(120 + 48) = \frac{8}{3} \cdot 168 = 8 \cdot 56 = 448$$

Binobarin, to'g'ri javob: A) 448

9. Radiusi R ga teng bo'lgan shar ichiga chizilgan eng katta hajmga ega bo'lgan konusning balandligini hisoblang.

A) $\frac{2}{3}R$ B) $\frac{1}{3}R$ C) $1\frac{2}{3}R$ D) $\frac{\sqrt{3}}{2}R$ E)

$1\frac{1}{3}R$

Yechilishi: Shaklga ko'ra $AO = R$, $AO_1 = r$, $SO = h$, $OO_1 = h - R$ uchburchak AOO_1 dan quyidagiga ega bo'lamiz. Ya'ni Pifagor teoremasiga asosan: $AO_1^2 = AO^2 - OO_1^2$ yoki $r^2 = R^2 - (h - R)^2 \Rightarrow r^2 = R^2 - h^2 + 2hR - R^2 = 2Rh - h^2$

$$\text{Bundan, } V = \frac{1}{3}\pi r^2 h = \frac{1}{3}\pi(2Rh - h^2) \cdot h = \frac{1}{3}\pi(2Rh^2 - h^3)$$

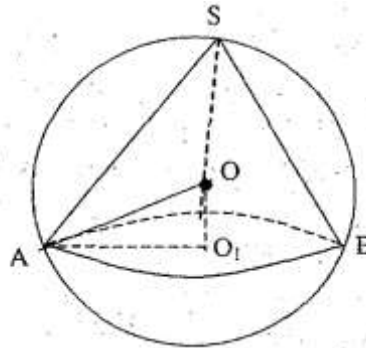


Endi funksiyaning ekstremumini topish qoidasini tadbqiq etamiz.

$$V = \frac{1}{3}\pi(2Rh - h^2) = 0$$

$$h(4R - 3h) = 0 \Rightarrow 4R - 3h = 0$$

$$h = \frac{4}{3}R = 1\frac{1}{3}R$$



9-chizma. Sharga ichki chizilgan konus.

Demak, to'g'ri javob: E) $1\frac{1}{3}R$

10. Munrazam to'rburchakli prizmaning hajmi 60 ga, yon sirti 120 ga teng prizma asosining simmetriya markazidan ustki asosining uchigacha bo'lgan masofani toping.

A) $\sqrt{182}$

B) $\sqrt{215}$

C) $\sqrt{227}$

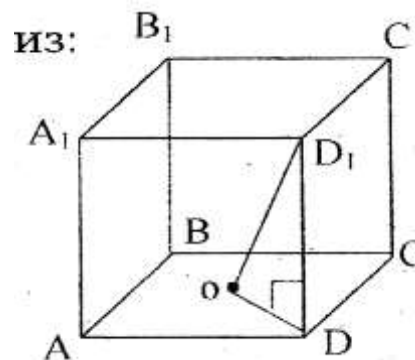
D) $\sqrt{239}$

E) $\sqrt{252}$

Yechilishi: Msala shartiga ko'ra quyidagilarga ega bo'lamiz:

$$\begin{cases} V = a^2 h = 60 \\ S_{yon} = 4ah = 120 \end{cases} \quad V : S_{yon} \Rightarrow \frac{a}{4} = \frac{1}{2}, \quad a = 2 \quad h = \frac{30}{a} = 15$$

Shaklga asosan: $OD = \frac{a\sqrt{2}}{2} = \sqrt{2}$



10-chizma. Kub tasviri.



$$\text{Demak, } OD_1^2 = OD^2 + DD_1^2 \text{ yoki } DD_1 = \sqrt{(\sqrt{2})^2 + 15^2} = \sqrt{2 + 225} = \sqrt{227}$$

Binobarin to'g'ri javob: C) $\sqrt{227}$

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