## MATEMATIKA

**1.**

$a$, $b$, $c$, $d$, $f$ turli raqamlar bo‘lib, $\overline{aaaa} - \overline{bbb} + \overline{cc} + d + f = 5000$ shart o‘rinli bo‘lsa, $a \cdot b - d \cdot f + c$ **ni hisoblang**.

A) *7*

B) *9*

C) *4*

D) *2*

**2.**

$\left(4,(6) \cdot 2\frac{4}{7} - 3\right) \cdot 1,0\,(5) - \frac{1}{0,4}$ ni **hisoblang**.

A) *7*

B) *9,5*

C) *6,5*

D) *12*

**3.**

Hovuzga 4 ta quvur o‘tkazilgan bo‘lib, birinchi va ikkinchi quvurlar uni to‘ldirish uchun, uchinchi va to‘rtinchi quvurlar esa uni bo‘shatish uchun mo‘ljallangan. Barcha quvurlar bir vaqtda ochilsa, bo‘sh hovuz 5 soatda to‘ladi. Bo‘sh hovuzga faqat birinchi, ikkinchi va uchinchi quvurlar ochilsa, u 3 soatda to‘ladi, agar faqat birinchi, uchinchi va to‘rtinchi quvurlar ochilsa, 30 soatda to‘ladi.

**Bo‘sh hovuzga faqat birinchi va uchinchi quvurlar ochilsa, u necha soatda to‘ladi**?

A) *9*

B) *5*

C) *8*

D) *6*

**4.**

Ko‘ylakning narxi dastlab 100 000 so‘m edi. Uning narxi avval 10 foizga qimmatlashdi keyin esa 15 foizga arzonlashdi.

**Ko‘ylakning narxi necha so‘m bo‘ldi**?

A) *93 500*

B) *103 500*

C) *90 000*

D) *95 000*

**5.**

$x$, $y$ natural sonlar uchun $x^2{=}2048^{24}$, $\sqrt[3]{y}{=}512^5$ bo‘lsa, $\dfrac{x}{y}$ ni toping.

A) $\dfrac{1}{64}$

B) $64$

C) $8$

D) $\dfrac{1}{8}$

**6.**

$\dfrac{1}{\sqrt{2}+\sqrt{3}-\sqrt{5}}$ ifodaning **maxrajidagi irratsionallikni yo‘qoting**.

A) $\dfrac{3\sqrt{2}+2\sqrt{3}+\sqrt{30}}{12}$

B) $\dfrac{3\sqrt{2}+2\sqrt{3}-\sqrt{30}}{12}$

C) $\dfrac{2\sqrt{2}+3\sqrt{3}+\sqrt{30}}{12}$

D) $\dfrac{3\sqrt{2}+2\sqrt{3}+\sqrt{30}}{6}$

**7.**

$\dfrac{\left(\sqrt{11}-\sqrt{5}\right)\left(\sqrt{15}-\sqrt{22}+\sqrt{33}-\sqrt{10}\right)}{\sqrt{108}-\sqrt{72}}$ ni **hisoblang**.

A) $2$

B) $1$

C) $1,2$

D) $-1$

**8.**

$\{a_n\}$ arifmetik progressiyada $a_{14}=20$ va $S_{28}=600$ bo‘lsa, $a_{28}$ **ni toping**.

A) *30*

B) *80*

C) *60*

D) *40*

**9.**

Kamayuvchi geometrik progressiyaning dastlabki 3 ta hadi yig‘indisi 14 ga teng bo‘lib, shu hadlar kvadratlarining yig‘indisi 84 ga teng.

**Progressiyaning dastlabki 6 ta hadi yig‘indisini toping.**

A) $3\frac{15}{16}$

B) $504$

C) $126$

D) $15\frac{3}{4}$

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**10.**

**Ifodani soddalashtiring:** $\dfrac{-4\cdot 4^{x-1}\cdot 3^{2x+1}-12^{x+1}\cdot 3^{x+2}}{8\cdot 36^{x}+18^{x}\cdot 2^{x+1}}$

A) $-10{,}5$

B) $10{,}5$

C) $-11{,}1$

D) $11{,}1$

**11.**

Agar $a$, $b$, $c$ haqiqiy sonlar uchun $|c|<|b|<|a|$ va $a<0$, $b>0$, $c<0$ tengsizliklar o‘rinli bo‘lsa, $\dfrac{a\,|b-c|}{|a|}+\dfrac{b\,|c-a|}{|b|}+\dfrac{c\,|a-b|}{|c|}$ **ni soddalashtiring**.

A) $2c-2a$

B) $2c-2b$

C) $2a-2b$

D) $0$

**12.**

Koordinatalar tekisligidagi birlik aylanada $\mathrm{P}(0;1)$ nuqtani 3 **radian** burchakka burish natijasida hosil bo‘lgan nuqta joylashgan **koordinatalar choragini aniqlang**.

A) $I$

B) $IV$

C) $III$

D) $II$

**13.**

$\dfrac{\sin^2 2\alpha\cdot \mathrm{tg}^2 2\alpha}{1-\mathrm{ctg}^2 2\alpha}+\dfrac{\cos^2 2\alpha\cdot \mathrm{ctg}^2 2\alpha}{1-\mathrm{tg}^2 2\alpha}+2$ **ifodani soddalashtiring**.

A) $\dfrac{4}{\sin^2 4\alpha}$

B) $\mathrm{tg}^2 2\alpha-\mathrm{ctg}^2 2\alpha$

C) $1$

D) $\mathrm{tg}^2 2\alpha+\mathrm{ctg}^2 2\alpha+1$

**14.**

$3^x+2^{x-1}-2^{x+2}-3^{x-1}+2^{x-3}\geq 0$ **tengsizlikni yeching**.

A) $[3;+\infty)$

B) $(-\infty;4)$

C) $[4;+\infty)$

D) $(-\infty;4]$

**15.**

**Hisoblang:** $2023^{\log^2_{2023}2024} - 2024^{\log_{2023}2024} - \log_2\log_2 \underbrace{\sqrt{\sqrt{...\sqrt{\sqrt{2}}}}}_{2023 \text{ ta}}$

A) $-2024$

B) *2023*

C) $-2023$

D) *2024*

**16.**

$\frac{(x+2)^2-9}{x+7} \cdot (x+7) = 16$ tenglama **nechta haqiqiy ildizga ega**?

A) *3 ta*

B) *haqiqiy ildizga ega emas*

C) *2 ta*

D) *1 ta*

**17.**

$(x-3)^2 + 3x = \sqrt{x^2-3x+7} + 22$ tenglamaning barcha haqiqiy ildizlari **ko‘paytmasini toping**.

A) $-162$

B) $-18$

C) *162*

D) $-9$

**18.**

$2x^2 + 2\sqrt{2}x + 1 \leq 0$ tengsizlikni qanoatlantiradigan **haqiqiy sonlar nechta**?

A) *0*

B) *1 ta*

C) *2 ta*

D) *cheksiz ko‘p*

**19.**

$\frac{x^2-5x+64}{x^2-10x+24} \leq \frac{10}{4-x}$ tengsizlikning **barcha butun yechimlari yig‘indisini toping**.

A) $-5$

B) *5*

C) *10*

D) *0*

**20.**

$f(x) = 6\sin x - 4\cos x$ funksiyaning qiymatlar sohasiga tegishli bo'lgan **natural sonlar jami nechta**?

A) *7 ta*

B) *14 ta*

C) *15 ta*

D) *4 ta*

**21.**

$f(x) = x^2 - \left(a^2 - 2a - 3\right)x + 6$ funksiyaning nollari $x_1 = 2$ va $x_2 = 3$ bo'lsa, $a$ ning qiymatlarini toping.

A) $-1;\ 1$

B) $2;\ 3$

C) $-2;\ 4$

D) $1;\ 2$

**22.**

$f\,(x) = |\log_{\cos x}\sin x - \ln\pi\,|$ funksiyaning $x_0 = \dfrac{\pi}{4}$ nuqtadagi hosilasini **hisoblang**.

A) $-2\log_2 e$

B) $4\log_2 e$

C) $2\log_2 e$

D) $-4\log_2 e$

**23.**

$\int\limits_2^4 \dfrac{3}{5 - 4x - x^2}\,dx$ **aniq integralni hisoblang**.

A) $\ln\sqrt{\dfrac{3}{7}}$

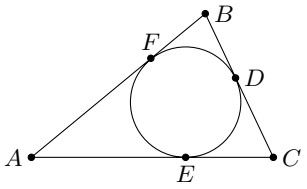
B) $\ln\sqrt{\dfrac{7}{3}}$

C) $\ln\dfrac{3}{7}$

D) $\ln\dfrac{7}{3}$

**24.**

$ABC$ uchburchakka aylana ichki chizilgan bo‘lib, $BC$ tomonga $D$ nuqtada, $AB$ tomonga $F$ nuqtada va $AC$ tomonga $E$ nuqtada urinadi (rasm).




Agar $AC = 10$ cm, $BC = 7$ cm va $AB = 9$ cm bo‘lsa, $AE$ **kesma uzunligini (cm) toping**.

A) *7*

B) *4*

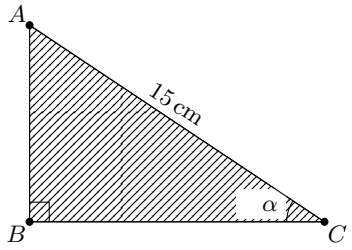
C) *8*

D) *6*

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**25.**

Quyidagi rasmda tasvirlangan $ABC$ to‘g‘ri burchakli uchburchakda $AB \perp BC$, $AC = 15$ cm va $\sin\alpha = 0,6$ bo‘lsa, **shu uchburchakning yuzini ($cm^2$) toping**.




A) *90*

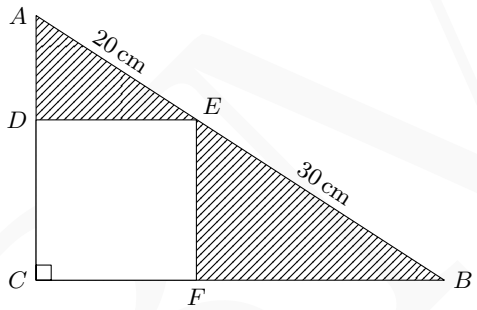
B) *56*

C) *108*

D) *54*

**26.**

$ABC$ to‘g‘ri burchakli uchburchakning ichki sohasida $C$ uchi umumiy bo‘lgan $CDEF$ kvadrat chizilgan. Bunda kvadratning qolgan $D$, $F$ va $E$ uchlari mos ravishda uchburchakning $AC$, $CB$ va $AB$ tomonlarida yotadi (rasm). Agar $AE = 20$ cm va $EB = 30$ cm bo‘lsa, **rasmda shtrixlangan sohalar yuzlari yig‘indisini ($cm^2$) toping**.




A) *600*

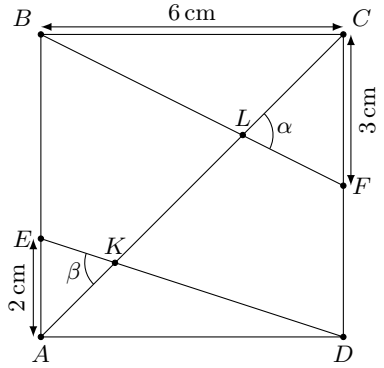
B) *225*

C) *325*

D) *300*

**27.**

Quyidagi rasmda $ABCD$ kvadrat tasvirlangan. Bu kvadratning $B$ va $D$ uchlaridan o‘tkazilgan $BF$ va $DE$ kesmalar $AC$ diagonalni mos ravishda $L$ va $K$ nuqtalarda kesadi.




Agar $AE$=2 cm, $BC$=6 cm, $CF$=3 cm, $\angle CLF = \alpha$ va $\angle EKA = \beta$ bo‘lsa, $\alpha + \beta$ **ning burchak kattaligini toping**.

A) $150°$

B) $135°$

C) $115°$

D) $120°$

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**28.**

Muntazam ko‘pburchakka aylana tashqi chizilgan.

Agar muntazam ko‘pburchakning bitta tashqi burchagi 45° ga teng bo‘lib, unga tashqi chizilgan aylana radiusi 2 cm ga teng bo‘lsa, **muntazam ko‘pburchak yuzini ($cm^2$) toping.**

A) $\sqrt{2}$

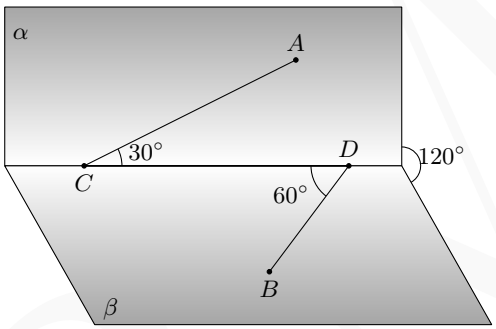
B) $8\sqrt{2}$

C) $6\sqrt{2}$

D) $4\sqrt{2}$

**29.**

Chiziqli burchagi 120° ga teng bo‘lgan ikkiyoqli burchakning turli yoqlaridan $A$ va $B$ nuqtalar, qirrasidan esa $C$ va $D$ nuqtalar olingan (rasm). Agar $\angle ACD = 30°$, $\angle BDC = 60°$, $AC = 12$ cm, $BD = 4\sqrt{3}$ cm va $CD = 7\sqrt{3}$ cm bo‘lsa, $A$ **va** $B$ **nuqtalar orasidagi masofani (cm) toping**.




A) *12*

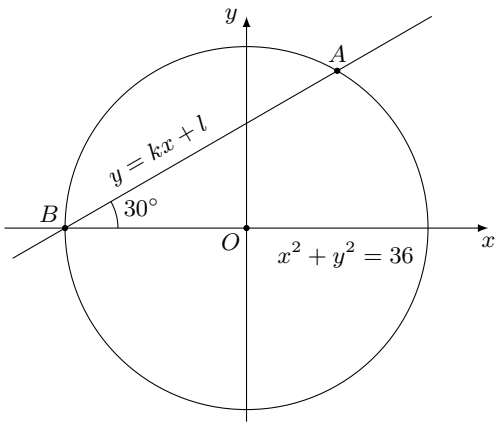
B) $\sqrt{75 + 6\sqrt{39}}$

C) $\sqrt{111}$

D) $6\sqrt{3}$

**30.**

Quyidagi rasmda tasvirlangan $y = kx + l$ to‘g‘ri chiziq $x^2 + y^2 = 36$ aylanani $A$ va $B$ nuqtalarda kesadi. Bunda $B$ nuqta $Ox$ o‘qiga tegishli.




Agar $y = kx + l$ to‘g‘ri chiziq $Ox$ o‘qi bilan $\angle ABO = 30^\circ$ burchak tashkil qilsa, $A$ **nuqtadan** $Ox$ **o‘qigacha bo‘lgan eng qisqa masofani toping**.

A) $2\sqrt{3}$

B) $6$

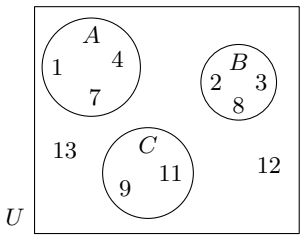
C) $3\sqrt{3}$

D) $3$

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**31.**

$U$ universal to‘plam va uning $A$, $B$ va $C$ qism to‘plamlari Venn diagrammasida tasvirlangan (rasm).




Rasmda tasvirlangan Venn diagrammasidan foydalanib $(A \cup B)' \cup A$ **to‘plamning qism to‘plamlari sonini toping**.

A) *64 ta*

B) *32 ta*

C) *256 ta*

D) *128 ta*

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**32.**

Barcha raqamlari toq bo‘lgan 3 ga karrali **uch xonali natural sonlar jami nechta**?

A) *36 ta*

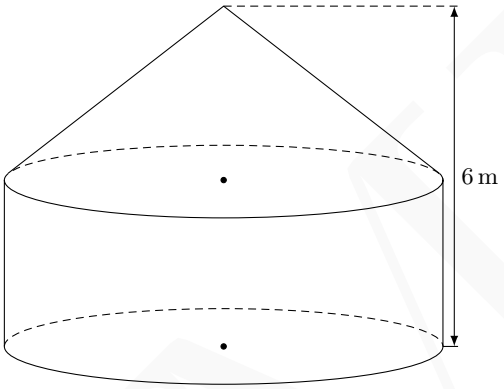
B) *29 ta*

C) *41 ta*

D) *35 ta*

**Test topshiriqlariga mos keluvchi javoblarni (A-F) javob variantlaridan tanlang.**

Chodirning pastki qismi silindr shaklida va yuqori (tom) qismi konus shaklida. Silindr va konus asoslarining radiuslari bir xil bo‘lib asoslari ustma-ust tushgan. Bunda silindr va konus qismining balandliklari o‘zaro teng bo‘lib, chodirning umumiy balandligi 6 m ga teng (rasm).




| | |
|---|---|
| **33.**<br>**Agar chodirning tom qismi(konusning yon sirti yuzi)ni yopish uchun $20\pi$ $m^2$ gazlama (mato) sarflangan bo‘lsa, chodirning hajmini ($m^3$) hisoblang.**<br>**34.**<br>**Agar chodirning yuqori qismidagi konusning hajmi $81\pi$ $m^3$ ga teng bo‘lsa, chodirning silindr shaklidagi qismining yon sirti yuzini ($m^2$) hisoblang.**<br>**35.**<br>**Agar chodirning konus shaklidagi qismining yasovchisi asosining radiusidan $\frac{\sqrt{17}}{4}$ marta katta bo‘lsa, chodirning silindr shaklidagi qismining yon sirti yuzini ($m^2$) toping.** | A) $72\pi$<br>B) $64\pi$<br>C) $54\pi$<br>D) $60\pi$<br>E) $68\pi$<br>F) $56\pi$ |

**36.**

Bizga $x^4 - 4x^3 - 4x^2 + 16x - 8 = 0$ tenglama berilgan bo‘lsin.

**a) Tenglama nechta haqiqiy ildizga ega?**

*Javob*: a) _____

**b) Agar tenglamaning haqiqiy ildizlari $x_1, x_2, \ldots, x_n$ bo‘lsa, $|x_1| + |x_2| + \ldots + |x_n|$ ni hisoblang.**

*Javob*: b) _____

**Diqqat!** Javoblaringizni javoblar varaqasiga ko‘chirib yozing.

**37.**

Bizga $\begin{cases} \text{tg}x + \text{tg}\dfrac{y}{2} = \dfrac{4}{\sqrt{3}} \\ \text{ctg}x + \text{ctg}\dfrac{y}{2} = \dfrac{4}{\sqrt{3}} \end{cases}$ tenglamalar sistemasi berilgan bo‘lsin.

**a) $\text{tg}\, y$ ning mumkin bo‘lgan eng kichik haqiqiy qiymatini toping.**

*Javob*: a) _____

**b) $x$ ning eng kichik musbat haqiqiy qiymatini toping.**

*Javob*: b) _____

**Diqqat!** Javoblaringizni javoblar varaqasiga ko‘chirib yozing.

**38.**

$f(x)$ funksiya uchun $f(x) + \dfrac{x-1}{2x+1} \cdot f\left(\dfrac{1}{x}\right) = \dfrac{3}{x-1}$ tenglik o‘rinli bo‘lsin.

**a) $f(2)$ ni hisoblang.**

*Javob*: a) _____

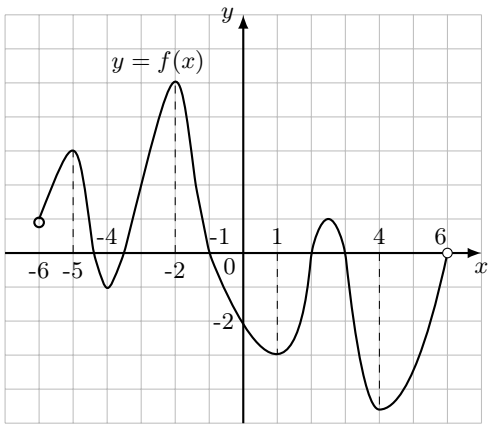
**b) $f(x) = 0$ tenglamaning haqiqiy ildizlari yig‘indisini (agar u yagona bo‘lsa, shu haqiqiy ildizni) toping.**

*Javob*: b) _____

**Diqqat!** Javoblaringizni javoblar varaqasiga ko‘chirib yozing.

**39.**

Quyidagi chizmada $(-6;\ 6)$ oraliqda aniqlangan $y = f(x)$ funksiya grafigi tasvirlangan.




**a) Chizmada berilgan ma'lumotlardan foydalanib, $y = f(x)$ funksiyaning $(-6; 6)$ oraliqdagi lokal maksimum nuqtalari sonini toping.**

*Javob*: a) _____

**b) Chizmada berilgan ma'lumotlardan foydalanib, $f'(x) = 0$ tenglamaning $(-6; 6)$ oraliqdagi ildizlari sonini toping.**

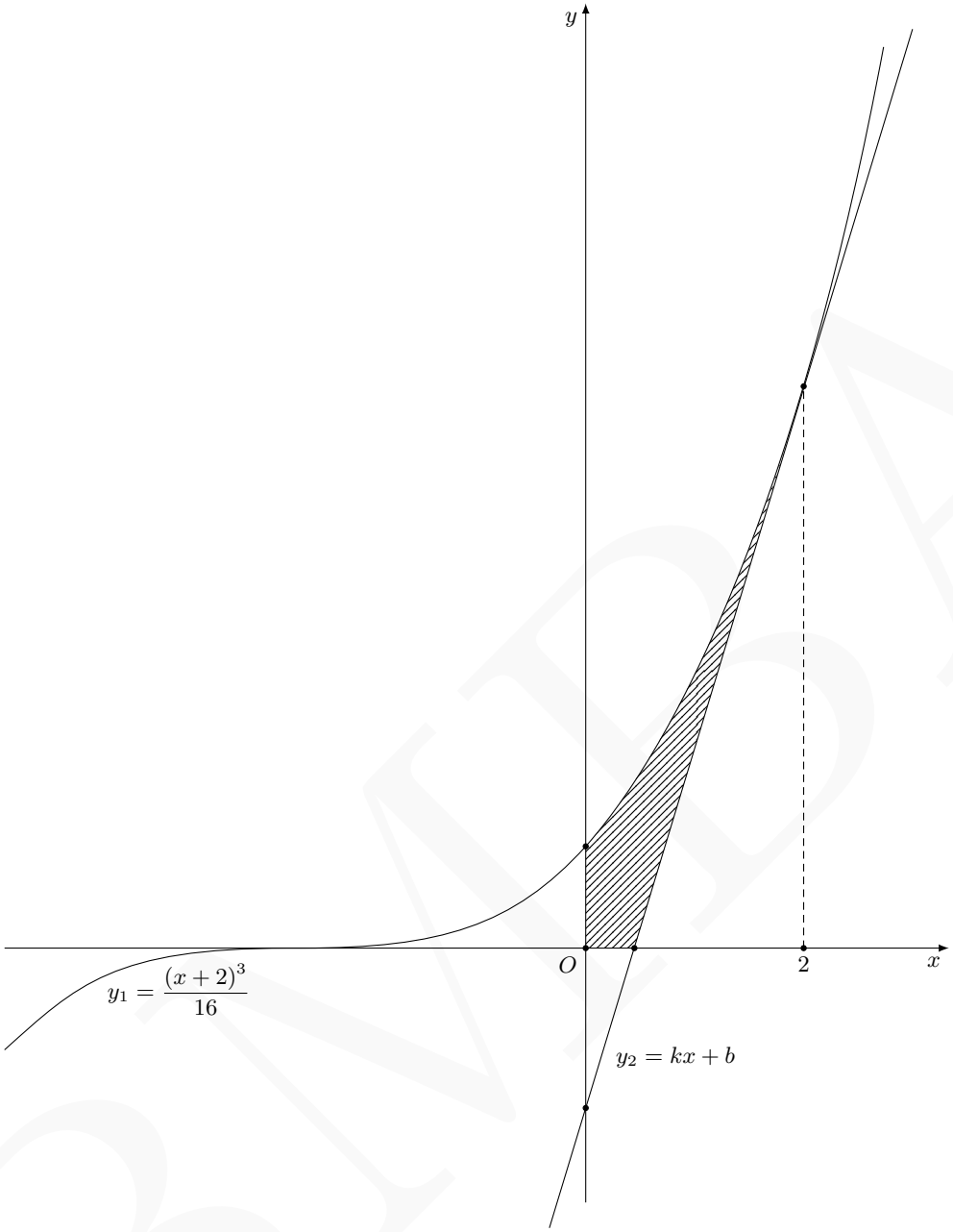
*Javob*: b) _____

**Diqqat!** Javoblaringizni javoblar varaqasiga ko'chirib yozing.

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**40.**

Quyidagi rasmda $y_1 = \dfrac{(x+2)^3}{16}$ egri chiziqli funksiya grafigi va funksiyaning $x_0 = 2$ abssissali nuqtasiga o‘tkazilgan $y_2 = kx + b$ urinma tasvirlangan.




**a) $k \cdot b^2$ ning qiymatini hisoblang.**

*Javob*: a) _____

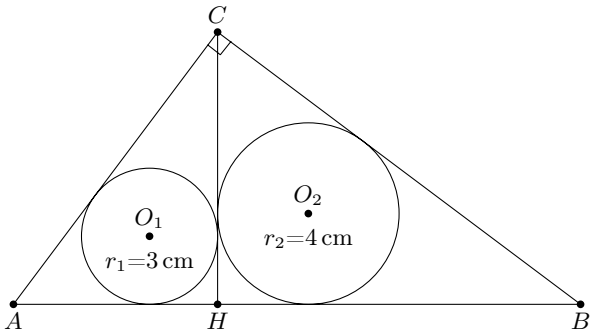
**b) rasmda shtrixlangan sohaning yuzini hisoblang.**

*Javob*: b) _____

**Diqqat!** Javoblaringizni javoblar varaqasiga ko‘chirib yozing.

**41.**

Quyidagi rasmda $ABC$ to‘g‘ri burchakli uchburchak tasvirlangan. Gipotenuzaga tushirilgan $CH$ balandlik uchburchakni $ACH$ va $CBH$ to‘g‘ri burchakli uchburchaklarga ajratadi. Bunda $ACH$ va $CBH$ uchburchaklarga ichki chizilgan aylanalarning radiuslari mos ravishda 3 cm va 4 cm ga teng.




**a) $CH$ balandlikning qiymatini (cm) toping.**

*Javob*: a) _____

**b) $ABC$ uchburchakning yuzini ($cm^2$) toping.**

*Javob*: b) _____

**Diqqat!** Javoblaringizni javoblar varaqasiga ko‘chirib yozing.

**42.**

Tomonlari 6 cm, 6 cm, 8 cm, 8 cm ga teng bo‘lgan qavariq to‘rtburchakka ichki va tashqi aylanalar chizilgan.

**a) to‘rtburchakning kichik diagonali uzunligini (cm) toping.**

*Javob*: a) _____

**b) ichki va tashqi chizilgan aylanalar markazlari orasidagi masofani (cm) toping.**

*Javob*: b) _____

**Diqqat!** Javoblaringizni javoblar varaqasiga ko‘chirib yozing.

**43.**

$ABCDEF$ qavariq oltiburchakning barcha tomonlari teng, hamda $\angle A = \angle E = 90°$, $BD = EF$ tengliklar o‘rinli bo‘lsin.

**a) Agar oltiburchakning tomoni 2 ga teng bo‘lsa, $BFD$ uchburchakning yuzini toping.**

*Javob*: a) _____

**b) Agar oltiburchakning tomoni $\dfrac{10}{\sqrt{4+\sqrt{7}+\sqrt{3}}}$ ga teng bo‘lsa, uning yuzini toping.**

*Javob*: b) _____

**Diqqat!** Javoblaringizni javoblar varaqasiga ko‘chirib yozing.

**44.**

Sharga ichki chizilgan konusning yon sirti yuzi $18\sqrt{2+\sqrt{3}} \cdot \pi$ cm$^2$ ga teng. Konusning yasovchisi asos tekisligi bilan $75°$ li burchak tashkil qiladi.

**a) Konus asosining radiusini (cm) toping.**

*Javob*: a) _____

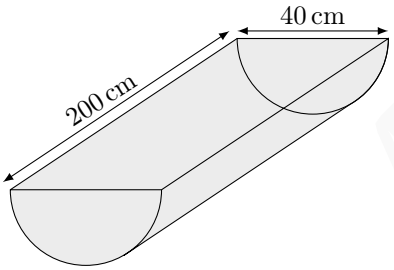
**b) Shar hajmini (cm$^3$) toping. ($\pi \approx 3$ deb hisoblansin)**

*Javob*: b) _____

**Diqqat!** Javoblaringizni javoblar varaqasiga ko‘chirib yozing.

**45.**

Uy hayvonlarini sug‘orish uchun metall listdan yarim silindr shaklida suv idishi yasalgan (rasm). Bunda suv idishning uzunligi 200 cm ga, kengligi esa 40 cm ga teng. Bu masalani yechishda $\pi \approx 3$ deb hisoblansin.




**a) Chiqindi chiqmagan deb hisoblab suv idish uchun necha detsimetr kvadrat metall list ishlatilganligini aniqlang.**

*Javob*: a) _____

**b) Bu idishga eng ko‘pi bilan necha litr suv sig‘ishini aniqlang.**

*Javob*: b) _____

**Diqqat!** Javoblaringizni javoblar varaqasiga ko‘chirib yozing.

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