MATEMATIKA

1 [1,3 ball]

a, b, c, d, f turli raqamlar bo'lib, $\overline{aaaa} - \overline{bbb} + \overline{cc} + d + f = 5000$ bo'lsa, $a \cdot b - d \cdot f + c$ **ning qiymatini toping.**

A) 4
B) 9
C) 7
D) 5

2 [1,3 ball]

Hisoblang: $\left(4,(6) \cdot 2\frac{4}{7} - 3\right) \cdot 1,0(5) - \frac{1}{0,4}$

A) 6
B) 7
C) 9,5
D) 7,5

3 [1,3 ball]

Hovuzga 4 ta quvur ulangan bo'lib, birinchi va ikkinchi quvurlar hovuzni to'ldiradi, uchinchi va to'rtinchi quvurlar hovuzdagi suvni bo'shatadi. Barcha quvurlar bir vaqtda ochilsa hovuz 5 soatda suvga to'ladi. Faqat birinchi, ikkinchi va uchinchi quvurlar ochilsa hovuz 3 soatda to'ladi. Agar faqat birinchi, uchinchi va to'rtinchi quvurlar ochilsa hovuz 30 soatda to'ladi. Faqat birinchi va uchinchi quvurlar ochilsa **hovuz necha soatda to'ladi?**

A) 4
B) 5
C) 6
D) 10

4 [1,3 ball]

Ko'ylakning narxi 100000 so'm edi. Dastlab ko'ylak narxi 10% ga oshirildi, keyin 15% ga arzonlashtirildi. **Ko'ylakning hozirgi narxini toping.**

A) 92000
B) 93500
C) 95000
D) 103500

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5 [1,3 ball]

Agar $x^2 = 2048^{24}$ va $\sqrt[3]{y} = 512^5$ bo'lsa, $\frac{x}{y}$ **ni toping.**

A) 8
B) $\frac{1}{8}$
C) 64
D) $\frac{1}{64}$

6 [1,3 ball]

Soddalashtiring: $\frac{(\sqrt{11}-\sqrt{5})(\sqrt{15}+\sqrt{33}-\sqrt{22}-\sqrt{10})}{\sqrt{108}-\sqrt{72}}$

A) 1
B) 2
C) 3
D) 4

7 [2,2 ball]

Kasr maxrajini irratsionallikdan qutqaring: $\frac{1}{\sqrt{2}+\sqrt{3}-\sqrt{5}}$

A) $\frac{3\sqrt{2}+2\sqrt{3}+\sqrt{30}}{6}$
B) $\frac{3\sqrt{2}+2\sqrt{3}+\sqrt{30}}{12}$
C) $\frac{3\sqrt{2}+2\sqrt{3}-\sqrt{30}}{12}$
D) $\frac{3\sqrt{2}+2\sqrt{3}-\sqrt{30}}{12}$

8 [2,2 ball]

Arifmetik progressiyada $a_{14} = 20$ va $S_{28} = 600$ bo'lsa, a_{28} **ni toping.**

A) 40
B) 60
C) 70
D) 80

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9 [2,2 ball]

Kamayuvchi geometrik progressiyaning dastlabki 3 ta hadi yig'indisi 14 ga, ularning kvadratlari yig'indisi 84 ga teng bo'lsa, **progressiyaning dastlabki 6 ta hadi yig'indisini toping.**

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

B) $14\frac{3}{4}$

C) $13\frac{2}{3}$

D) $12\frac{1}{5}$

10 [1,3 ball]

$P(0;1)$ nuqtani 3 radianga burish natijasida hosil bo'lgan nuqta **qaysi chorakda yotadi?**

A) II

B) III

C) I

D) IV

11 [1,3 ball]

Agar $|c| < |b| < |a|$ va $a < 0$, $b > 0$, $c < 0$ bo'lsa, $\frac{a|b-c|}{|a|} + \frac{b|c-a|}{|b|} + \frac{c|a-b|}{|c|}$ **ni hisoblang.**

A) $2a - 2b$

B) 0

C) $2c - 2a$

D) $2c - 2b$

12 [2,2 ball]

Ifodani soddalashtiring: $\dfrac{-4 \cdot 4^{x-1} \cdot 3^{2x+1} - 12^{x+1} \cdot 3^{x+2}}{36^x \cdot 8 + 9^x \cdot 2^{2x+1}}$

A) 11,1

B) 10,1

C) $-11,1$

D) $-10,1$

13 [2,2 ball]

Ifodani soddalashtiring: $\dfrac{\sin^2 2\alpha \cdot \operatorname{tg}^2 2\alpha}{1-\operatorname{ctg}^2 2\alpha} + \dfrac{\cos^2 2\alpha \cdot \operatorname{ctg}^2 2\alpha}{1-\operatorname{tg}^2 2\alpha} + 2$

A) $\operatorname{tg}^2 2\alpha - \operatorname{ctg}^2 2\alpha$

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

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

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

14 [2,2 ball]

Tengsizlikni yeching: $3^x - 2^{x+2} + 2^{x-3} + 2^{x-1} - 3^{x-1} \geq 0$

A) $x \in (5; +\infty)$

B) $x \in (4; +\infty)$

C) $x \in [4; +\infty)$

D) $x \in [5; +\infty)$

15 [2,2 ball]

Ifodaning qiymatini toping: $2023^{\log^2_{2023} 2024} - 2024^{\log_{2023} 2024} - \log_2 \log_2 \underbrace{\sqrt{\sqrt{\sqrt{\ldots\sqrt{2}}}}}_{2023 \text{ ta}}$

A) 2024

B) -2023

C) -2024

D) 2023

16 [1,3 ball]

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

A) 1

B) 2

C) 3

D) Yechimga ega emas.

17 [2,2 ball]

Tenglamaning haqiqiy **ildizlari ko'paytmasini toping:**

$(x-3)^2+3x=\sqrt{x^2-3x+7}+22$

A) 162
B) -18
C) -9
D) -162

18 [2,2 ball]

$2x^2+2\sqrt{2}x+1\le 0$ **tengsizlik nechta yechimga ega?**

A) 1
B) 2
C) 0
D) Cheksiz ko'p.

19 [2,2 ball]

Tengsizlikni qanoatlantiruvchi butun sonlar **yig'indisini toping:**

$$\frac{x^2-5x+64}{x^2-10x+24}\le\frac{10}{4-x}$$

A) 0
B) 10
C) 5
D) -5

20 [2,2 ball]

Nechta natural son $f(x)=6\sin x-4\cos x$ funksiyaning **qiymatlar sohasiga tegishli?**

A) 15
B) 7
C) 4
D) 14

21 [2,2 ball]

$y = x^2 - (a^2 - 2a - 3)x + 6$ funksiya nollari $x_1 = 2$ va $x_2 = 3$ bo'ladigan a **ning qiymatlarini toping.**

A) $1;\ 2$
B) $-2;\ 1$
C) $4;\ -2$
D) $0;\ 2$

22 [2,2 ball]

Agar $f(x) = |\log_{\cos x} \sin x - \ln \pi|$ bo'lsa, $f'\left(\frac{\pi}{4}\right)$ **ni toping.**

A) $\log_2 e$
B) $-4\log_2 e$
C) $-4\log_4 e$
D) $4\log_2 e$

23 [2,2 ball]

Aniq integralni hisoblang: $\int\limits_2^4 \frac{3}{5 - 4x - x^2}dx$

A) $\ln\frac{3}{7}$
B) $\ln\sqrt{\frac{3}{7}}$
C) $\ln\sqrt{\frac{7}{3}}$
D) $\ln\frac{7}{3}$

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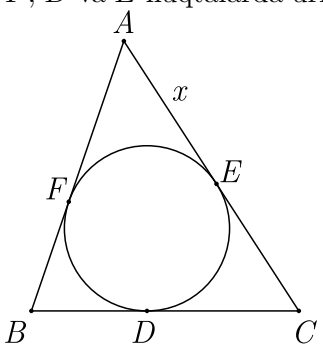
24 [2,2 ball]

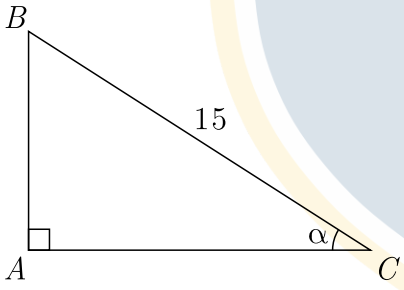
ABC uchburchakka ichki chizilgan aylana uchburchakning AB, BC va AC tomonlariga mos ravishda F, D va E nuqtalarda urinadi. Agar $AB = 9$, $BC = 7$ va $AC = 10$ bo'lsa, AE **kesma uzunligini toping.**



A) 4
B) 6
C) 8
D) 5

25 [1,3 ball]

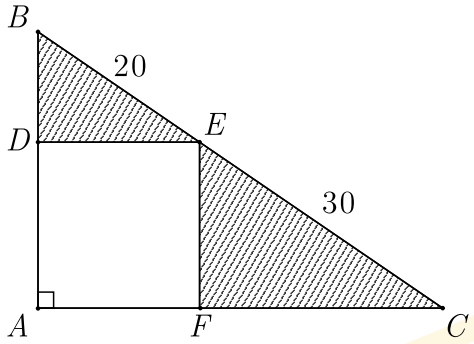
ABC to'g'ri burchakli uchburchak gipotenuzasi uzunligi 15 ga, $\sin(\angle ACB) = 0,6$ bo'lsa, **uchburchak yuzini toping.**



A) 56
B) 54
C) 108
D) 36

26 [2,2 ball]

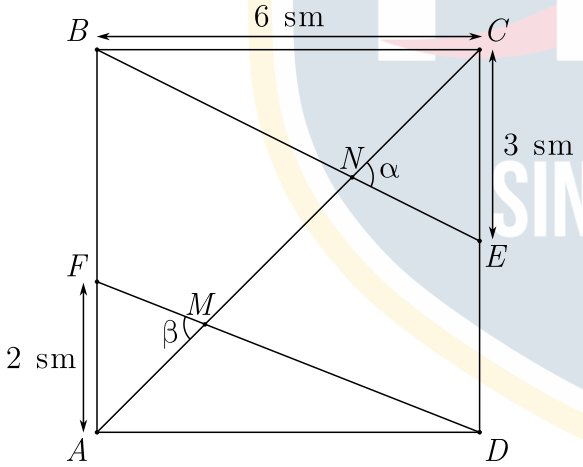
ABC to'g'ri burchakli uchburchakka $ADEF$ kvadrat shunday ichki chizilganki, kvadratning bir uchi uchburchakning to'g'ri burchagida, qolgan uchlari esa uchburchak tomonlarida yotadi. Agar $BE = 20$, $EC = 30$ bo'lsa, **bo'yalgan sohalar yuzlarining yig'indisini toping.**



A) 600
B) 325
C) 300
D) 225

27 [2,2 ball]

$ABCD$ kvadrat tomoni uzunligi 6 ga teng. $AF = 2$, $CE = 3$, $\angle CNE = \alpha$, $\angle FMA = \beta$ bo'lsa, $\alpha + \beta$ **ni toping.**



A) 115°
B) 135°
C) 150°
D) 120°

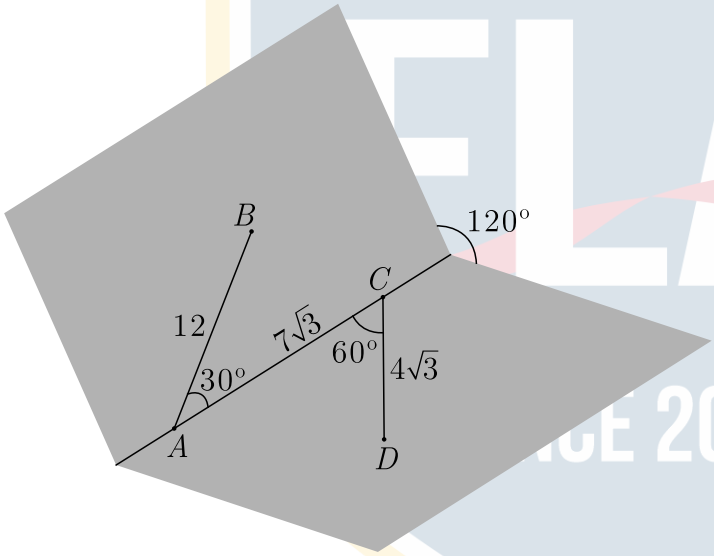
28 [2,2 ball]

Tashqi burchagi 45° ga teng bo'lgan muntazam ko'pburchakka aylana tashqi chizilgan. Aylananing radiusi 2 ga teng bo'lsa, **ko'pburchak yuzini toping.**

A) $4\sqrt{2}$
B) $\sqrt{2}$
C) $6\sqrt{2}$
D) $8\sqrt{2}$

29 [2,2 ball]

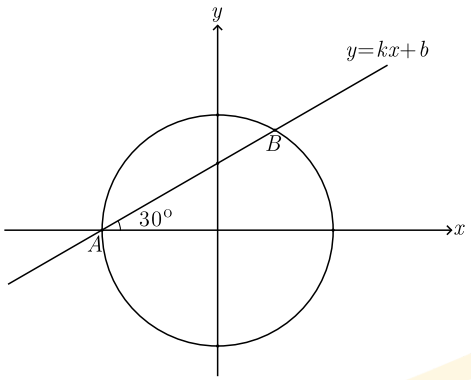
O'zaro 120° li burchak tashkil qiluvchi ikki yoqli tekislik berilgan. A, B, C va D nuqtalar tekisliklarga tegishli. Agar $AC = 7\sqrt{3}$, $AB = 12$, $DC = 4\sqrt{3}$, $\angle BAC = 30°$ va $\angle ACD = 60°$ bo'lsa, B va D nuqtalar orasidagi **masofani toping.**



A) $6\sqrt{3}$
B) 12
C) $\sqrt{75 + 6\sqrt{39}}$
D) $\sqrt{111}$

30 [2,2 ball]

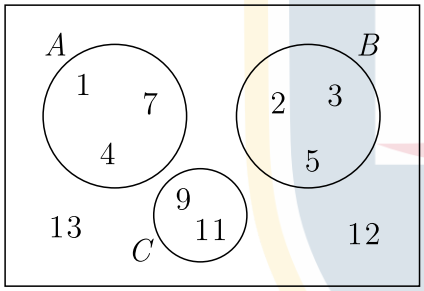
Rasmda $x^2 + y^2 = 36$ aylana va $y = kx + b$ to'g'ri chiziq grafiklari tasvirlangan. Berilganlarga ko'ra, A nuqtadan Ox o'qigacha bo'lgan **eng qisqa masofani toping.**



A) 6
B) $3\sqrt{3}$
C) 3
D) $6\sqrt{3}$

31 [2,2 ball]

Quyidagi universal to'plam ichida A va B to'plamlar berilgan. $(A \cup B)' \cup A$ ning **qism to'plamlari sonini toping.**



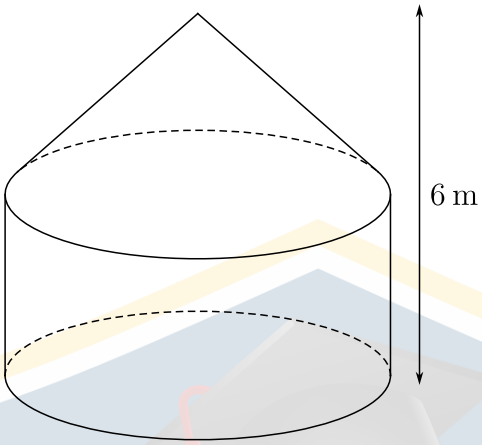
A) 128
B) 64
C) 256
D) 32

32 [2,2 ball]

Barcha raqamlari toq bo'lgan, **uchga karrali uch xonali sonlar nechta?**

A) 35
B) 36
C) 41
D) 29

Topshiriqlar (33-35) va javob variant (A-F) larni o'zaro moslashtiring.
Chodirning ustki qismi konus, pastki qismi esa silindrdan iborat. Konus va silindrning asoslari bir-biriga mos tushadi va ularning balandliklari ham teng. Chodirning umumiy balandligi 6 m ga teng.



33 [2,2 ball]

Chodirning konus shaklidagi tom qismini qoplash uchun 20π m^2 gazlama ketgan bo'lsa, chodirning hajmini toping.

34 [2,2 ball]

Konusning hajmi 81π m^3 bo'lsa, silindr yon sirtini toping.

35 [2,2 ball]

Konus yasovchisi konus asosidan $\frac{\sqrt{17}}{4}$ marta katta bo'lsa, silindr yon sirtini toping.

To'g'ri javoblar

A) 54π

B) 56π

C) 60π

D) 64π

E) 68π

F) 72π

36

$x^4 - 4x^3 - 4x^2 + 16x - 8 = 0$ tenglama berilgan.

[1,5 ball]

a) Tenglamaning haqiqiy ildizlari nechta?

Javob: a) _____

[1,7 ball]

b) Tenglamaning haqiqiy ildizlari $x_1,\ x_2,\ \ldots x_n$ bo'lsa, $|x_1| + |x_2| + \ldots + |x_n|$ ni toping.

Javob: b) _____

Diqqat! Javoblaringizni javoblar varaqasiga ko'chirib yozing.

37

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

[1,5 ball]

a) tg$y$ ning eng kichik qiymatini toping.

Javob: a) _____

[1,7 ball]

b) x ning eng kichik qiymatini toping.

Javob: b) _____

Diqqat! Javoblaringizni javoblar varaqasiga ko'chirib yozing.

38

$f(x)+\dfrac{x-1}{2x+1}\cdot f\left(\dfrac{1}{x}\right)=\dfrac{3}{x-1}$ tenglik x ning haqiqiy qiymatlarida o'rinli.

[1,5 ball]

a) $f(2)$ **ning qiymatini toping.**

Javob: a) _____

[1,7 ball]

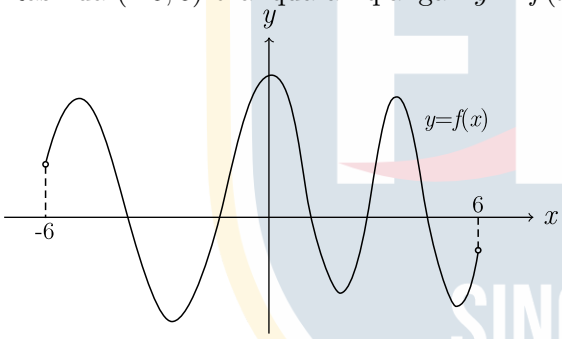
b) $f(x)=0$ **tenglamaning ildizlari yig'indisini toping.**

Javob: b) _____

Diqqat! Javoblaringizni javoblar varaqasiga ko'chirib yozing.

39

Rasmda $(-6;6)$ oraliqda aniqlangan $y=f(x)$ funksiyaning grafigi tasvirlangan.



[1,5 ball]

a) $f(x)$ **funksiyaning** $(-6;6)$ **oraliqda nechta lokal maksimum nuqtasi bor?**

Javob: a) _____

[1,7 ball]

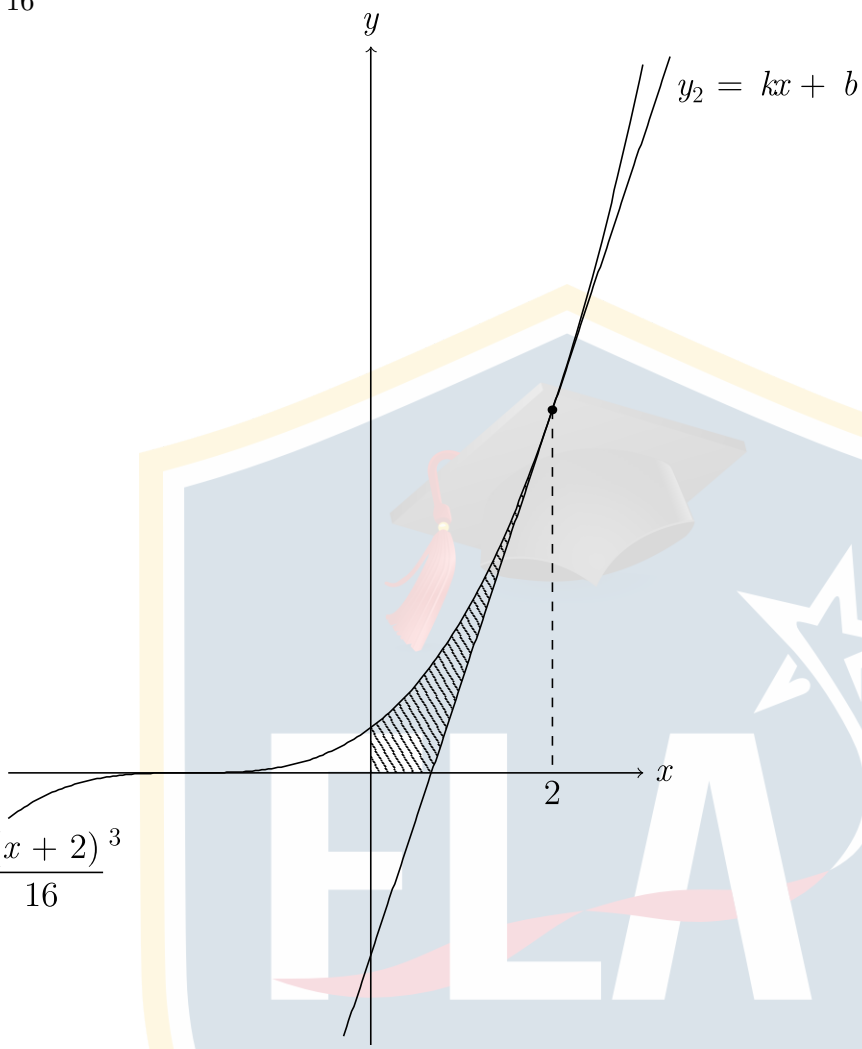
b) $f'(x)=0$ **tenglamaning** $(-6;6)$ **oraliqdagi ildizlar sonini toping.**

Javob: b) _____

Diqqat! Javoblaringizni javoblar varaqasiga ko'chirib yozing.

40

$y_1 = \dfrac{(x+2)^3}{16}$ funksiyaga $x_0 = 2$ nuqtada $y_2 = kx + b$ urinma o'tkazilgan.



[1,5 ball]

a) $k \cdot b^2$ **ni toping.**

Javob: a) _____

[1,7 ball]

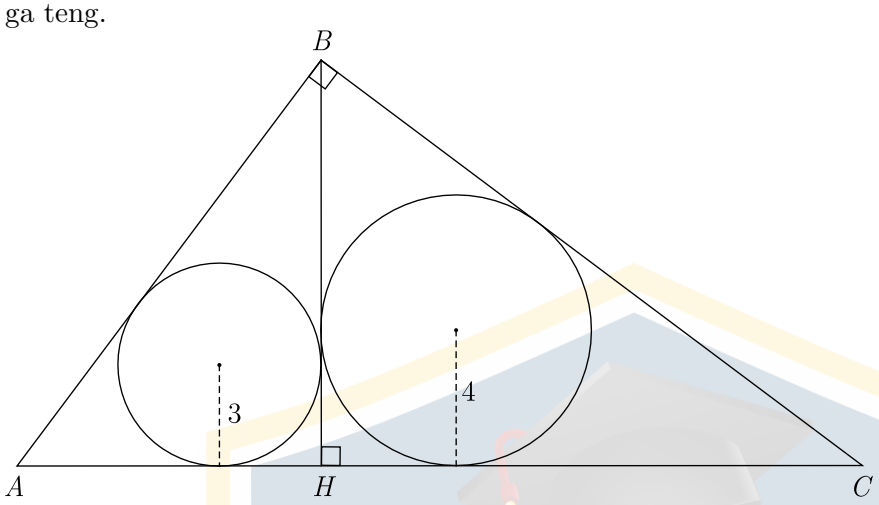
b) Bo'yalgan soha yuzini toping.

Javob: b) _____

Diqqat! Javoblaringizni javoblar varaqasiga ko'chirib yozing.

41

ABC to'g'ri burchakli uchburchakda BH balandligi uni ikkita ABH va BCH to'g'ri burchakli uchburchaklarga ajratadi. ABH va BCH uchburchaklarga ichki chizilgan aylana radiuslari mos ravishda 3 va 4 ga teng.



[1,5 ball]

a) BH balandlikni toping.

Javob: a) _____

[1,7 ball]

b) ABC uchburchakning yuzini toping.

Javob: b) _____

Diqqat! Javoblaringizni javoblar varaqasiga ko'chirib yozing.

42

Tomonlari 6, 6, 8, 8 ga teng bo'lgan qavariq to'rtburchak berilgan. Unga ichki va tashqi aylanalar chizilgan.

[1,5 ball]

a) To'rtburchakning kichik diagonalini toping.

Javob: a) _____

[1,7 ball]

b) Ichki va tashqi chizilgan aylanalar markazlari orasidagi masofani toping.

Javob: b) _____

Diqqat! Javoblaringizni javoblar varaqasiga ko'chirib yozing.

43

$ABCDEF$ qavariq oltiburchakning barcha tomonlari 2 ga teng. Bunda $BD = FE$, $\angle A = \angle E = 90°$

[1,5 ball]

a) BFD uchburchak yuzini toping.

Javob: a) _____

[1,7 ball]

b) Oltiburchak tomoni $\dfrac{10}{\sqrt{4+\sqrt{7}+\sqrt{3}}}$ bo'lsa, oltiburchak yuzini toping.

Javob: b) _____

Diqqat! Javoblaringizni javoblar varaqasiga ko'chirib yozing.

44

Sharga konus ichki chizilgan. Konus yon sirti $18\sqrt{2+\sqrt{3}}\pi$ ga va konus yasovchisi va asos tekisligi orasidagi burchak $75°$ ga teng.

[1,5 ball]

a) Konus asosining radiusini toping.

Javob: a) _____

[1,7 ball]

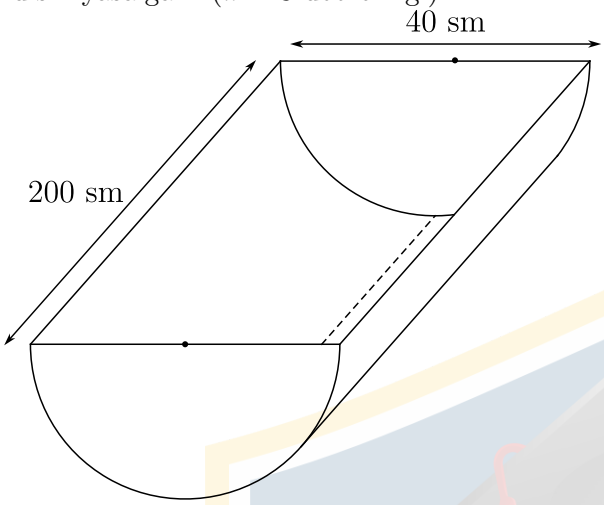
b) Shar hajmini toping. ($\pi \approx 3$ deb olinsin.)

Javob: b) _____

Diqqat! Javoblaringizni javoblar varaqasiga ko'chirib yozing.

45

Uy hayvonlari uchun yarim silindr shaklidagi temir tunukadan uzunligi 200 sm, diametri 40 sm bo'lgan suv idishi yasalgan. ($\pi \approx 3$ deb oling.)



[1,5 ball]

a) Idishni yasashda chiqindi chiqmagan bo'lsa, qancha (dm^2) tunuka ishlatilgan?

Javob: a) _____

[1,7 ball]

b) Idishga eng ko'pi bilan necha litr suv sig'adi?

Javob: b) _____

Diqqat! Javoblaringizni javoblar varaqasiga ko'chirib yozing.