11-sinf. Matematika

1-bilet

1-misol.

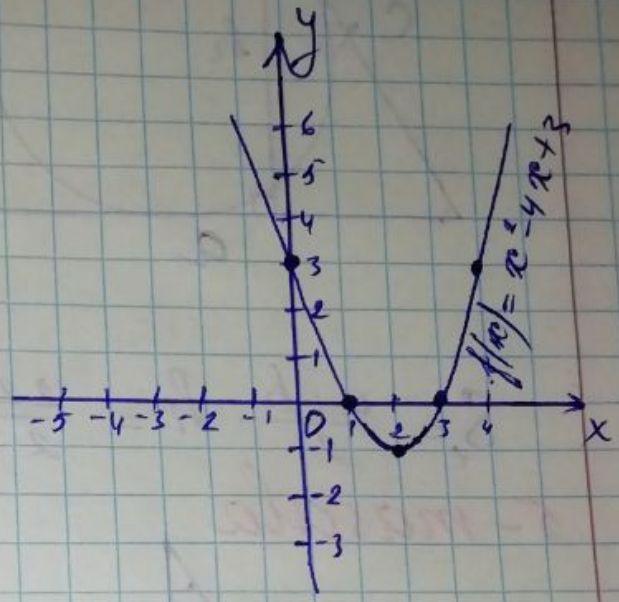
$f(x) = x^2 - 4x + 3$

1) $x_0 = -\frac{-4}{2 \cdot 1} = 2$

$y_0 = 2^2 - 4 \cdot 2 + 3 = -1$

2) $x = 0 \quad y = 3$

$y = 0 \quad x_1 = 1;\ x_2 = 3$



2-misol

$$\log_{3\sqrt{3}} 27 + \log_{\sqrt{5}} 125 = \log_{3^{\frac{3}{2}}} 3^3 + \log_{5^{\frac{1}{2}}} 5^3 =$$

$$= \frac{2}{3} \cdot 3 \log_3 3 + 2 \cdot 3 \log_5 5 = 2 + 6 = 8.$$

3-misol

$\sin x + \sqrt{3} \cos x = 2$

$2\left(\frac{1}{2} \sin x + \frac{\sqrt{3}}{2} \cos x\right) = 2$

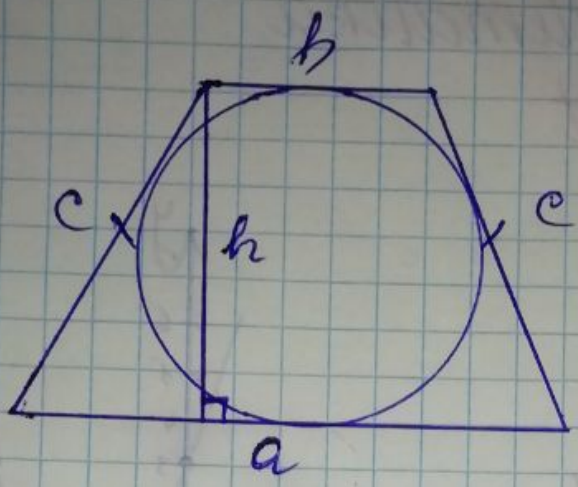
$\cos 60^\circ \cdot \sin x + \sin 60^\circ \cdot \cos x = 1$

$\sin(x + 60^\circ) = 1$

$x + \frac{\pi}{3} = \frac{\pi}{2} + 2\pi k$

$x = \frac{\pi}{6} + 2\pi k$

4-masala



$r = 4,5$ cm

$P = 44$ cm.

$a + b + 2c = 44$

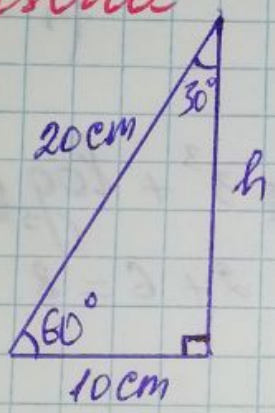
$a + b = 2c = 44 : 2$

$a + b = 22$

$h = 2r = 9$

$$S_t = \frac{a+b}{2} \cdot h = \frac{22}{2} \cdot 9 = 99 \text{ cm}^2$$

5-masala



$h = \sqrt{400 - 100} = 10\sqrt{3}$ cm

Javob: Oğma prizmaning balandligi $10\sqrt{3}$ cm.

2-bilet

1-misol

$$3^{x^2-7x} = \frac{1}{729}$$

$$3^{x^2-7x} = 3^{-6}$$

$$x^2 - 7x = -6$$

$$x^2 - 7x + 6 = 0$$

$$x_1 = 1 \quad x_2 = 6$$

2-masala

$\sin^2 x + 3\sin x - 4 \geq 0$

$\sin x = t.$

$t^2 + 3t - 4 \geq 0.$

$t \in -4 \quad \underline{t \geq 1}$

$\sin x \geq 1$

$x \in [0 + 2\pi k ; \pi + 2\pi k]$

$x \in [2\pi k ; \pi + 2\pi k]$

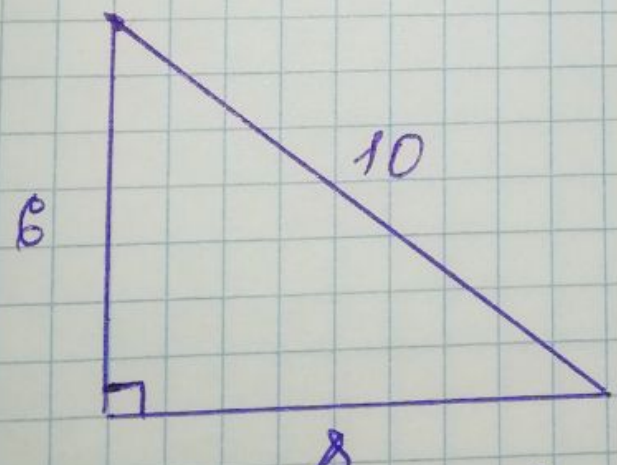
3-misol

$f(x) = \sin x \cdot \cos 3x$

$f'(x) = (\sin x)' \cdot \cos 3x + (\cos 3x)' \cdot \sin x =$

$= \cos x \cdot \cos 3x - 3\sin 3x \cdot \sin x$

4-masala



$r = \frac{a+b-c}{2} =$

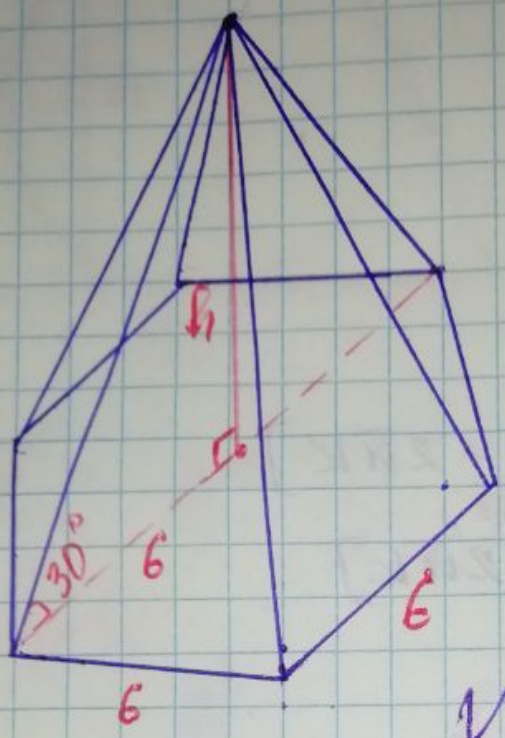
$= \frac{6+8-10}{2} = \frac{4}{2} =$

$= 2$ cm.

$S_d = \pi r^2 = 4\pi.$

Javob: To'g'ri burchakli uchburchakka ichki chizilgan doira yuzi 4π ga teng.

5- masala



$$V_p = \frac{1}{3} S_{as} \cdot h$$

$$S_{as} = \frac{3\sqrt{3} \cdot 6^2}{2} =$$

$$= \frac{3\sqrt{3} \cdot 36}{2} = 54\sqrt{3}$$

$$\frac{h}{6} = tg\,30°$$

$$\frac{h}{6} = \frac{1}{\sqrt{3}}$$

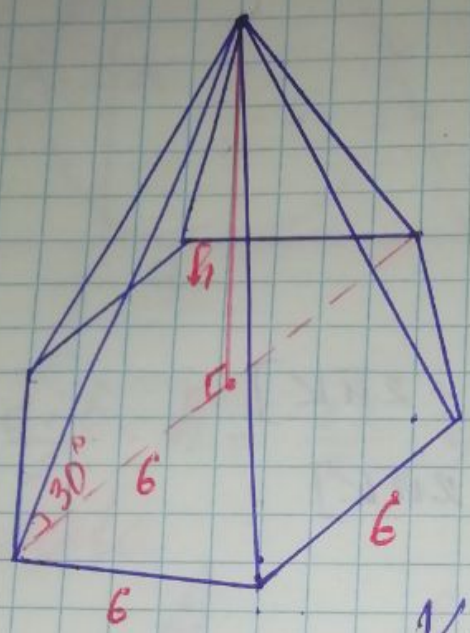
$$h = 2\sqrt{3}$$

$$V_p = \frac{1}{3} \cdot 54\sqrt{3} \cdot 2\sqrt{3} = 108$$

Javob: Piramidaning hajmi 108 ga teng.

3- bilet

5- masala



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Javob: Piramidaning hajmi 108 ga teng.

3- bilet

1- misol

$$\left(\frac{\sqrt{a}}{b+\sqrt{ab}} - \frac{\sqrt{a}}{b-\sqrt{ab}}\right) \cdot \frac{b-a}{2\sqrt{ab}} = \left(\frac{\sqrt{a}}{\sqrt{b}(\sqrt{b}+\sqrt{a})} -$$

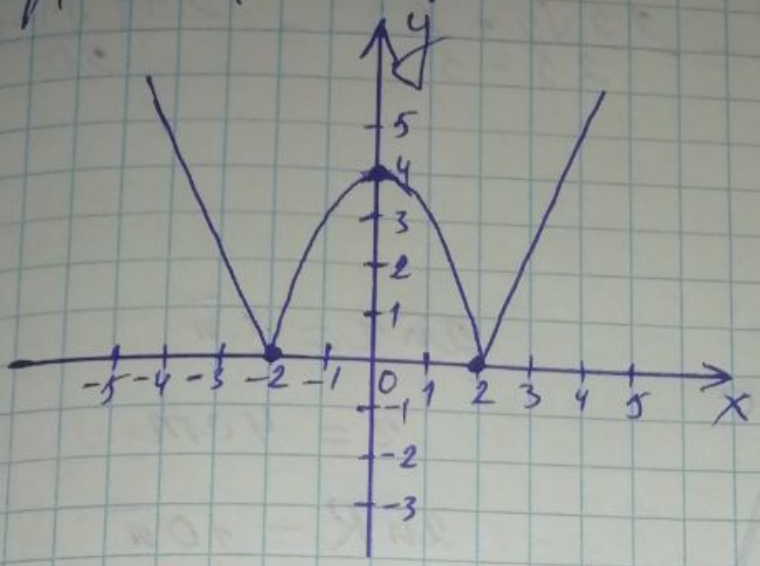
$$- \frac{\sqrt{a}}{\sqrt{b}(\sqrt{b}-\sqrt{a})}\right) \cdot \frac{b-a}{2\sqrt{ab}} = \frac{\sqrt{a}}{\sqrt{b}} \cdot \left(\frac{1}{\sqrt{b}+\sqrt{a}} - \frac{1}{\sqrt{b}-\sqrt{a}}\right) \cdot$$

$$\cdot \frac{b-a}{2\sqrt{ab}} = \frac{\sqrt{a}}{\sqrt{b}} \cdot \left(\frac{\sqrt{b}-\sqrt{a}-\sqrt{b}-\sqrt{a}}{(\sqrt{b}-\sqrt{a})(\sqrt{b}+\sqrt{a})}\right) \cdot \frac{b-a}{2\sqrt{ab}} =$$

$$= \frac{\sqrt{a}}{\sqrt{b}} \cdot \frac{(-2\sqrt{a})}{b-a} \cdot \frac{b-a}{2\sqrt{ab}} = -\frac{\sqrt{a}}{b}$$

2-misol

$f(x) = |x^2 - 4|$



$x_0 = 0$

$y_0 = 4$

$x^2 - 4 = 0$

$x_{1,2} = \pm 2$

3-misol

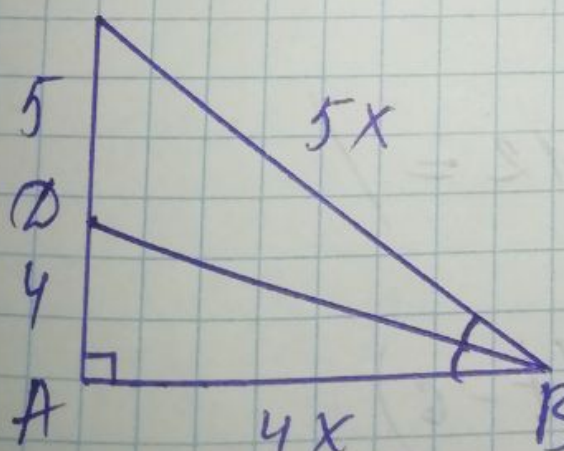
$f(x) = \cos 5x \cdot \cos 2x$

$$\int \cos 5x \cdot \cos 2x \, dx = \int \frac{1}{2}(\cos 3x + \cos 7x)dx =$$

$$= \frac{1}{2} \cdot \int (\cos 3x + \cos 7x)\, dx = \frac{1}{2}\left(-\frac{1}{3}\sin 3x - \right.$$

$$\left. - \frac{1}{7}\sin 7x = -\frac{1}{6}\sin 3x - \frac{1}{14}\sin 7x + C\right.$$

4-misol



$9^2 + (4x)^2 = (5x)^2$

$81 + 16x^2 = 21x^2$

$5x^2 = 81$

$x = \frac{9}{\sqrt{5}} = \frac{9\sqrt{5}}{5}$

$R = \frac{CB}{2} = \frac{9\sqrt{5}}{2}$

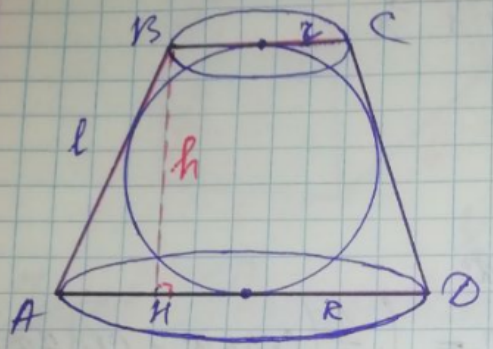
$$r = \frac{9 + \frac{36\sqrt{5}}{5} - \frac{45\sqrt{5}}{5}}{2} = \frac{9 - \frac{9\sqrt{5}}{5}}{2} = \frac{45 - 9\sqrt{5}}{10}$$

$$\frac{R}{r} = \frac{9\sqrt{5}}{2} \cdot \frac{10}{45 - 9\sqrt{5}} = \frac{5 \cdot 9\sqrt{5}}{9(5 - \sqrt{5})} = \frac{5\sqrt{5}}{5 - \sqrt{5}} =$$

$$= \frac{5\sqrt{5} \cdot (5 + \sqrt{5})}{(5 - \sqrt{5})(5 + \sqrt{5})} = \frac{25\sqrt{5} + 25}{25 - 5} = \frac{25(\sqrt{5} + 1)}{20} =$$

$$= \frac{5(\sqrt{5} + 1)}{4}$$

5- masala



$2\pi r = 8\pi$

$r = 4$ cm

$2\pi R = 10\pi$

$R = 5$ cm

$l = \frac{2r + 2R}{2} = 9$ cm

$AH = \frac{2R - 2r}{2} = 1$ cm

$h = \sqrt{l^2 - AH^2} = \sqrt{81 - 1} = 4\sqrt{5}$

$R_{shar} = \frac{h}{2} = 2\sqrt{5}$ cm

4- bilet

1- misol

$(x^2 + x)^2 - 8(x^2 + x) + 12 =$

$x^2 + x = t$

$t^2 - 8t + 12 = (t - 2)(t - 6)$

$(x^2 + x)^2 - 8(x^2 + x) + 12 = (x^2 + x - 2)(x^2 + x - 6) =$

$= (x - 1)(x + 2) \cdot (x - 2)(x + 3).$

2-misol

$$C_5^2 \cdot C_4^2 \cdot C_4^2 = \frac{5!}{2! \cdot 3!} \cdot \frac{4!}{2! \cdot 2!} \cdot \frac{4!}{2! \cdot 2!} =$$

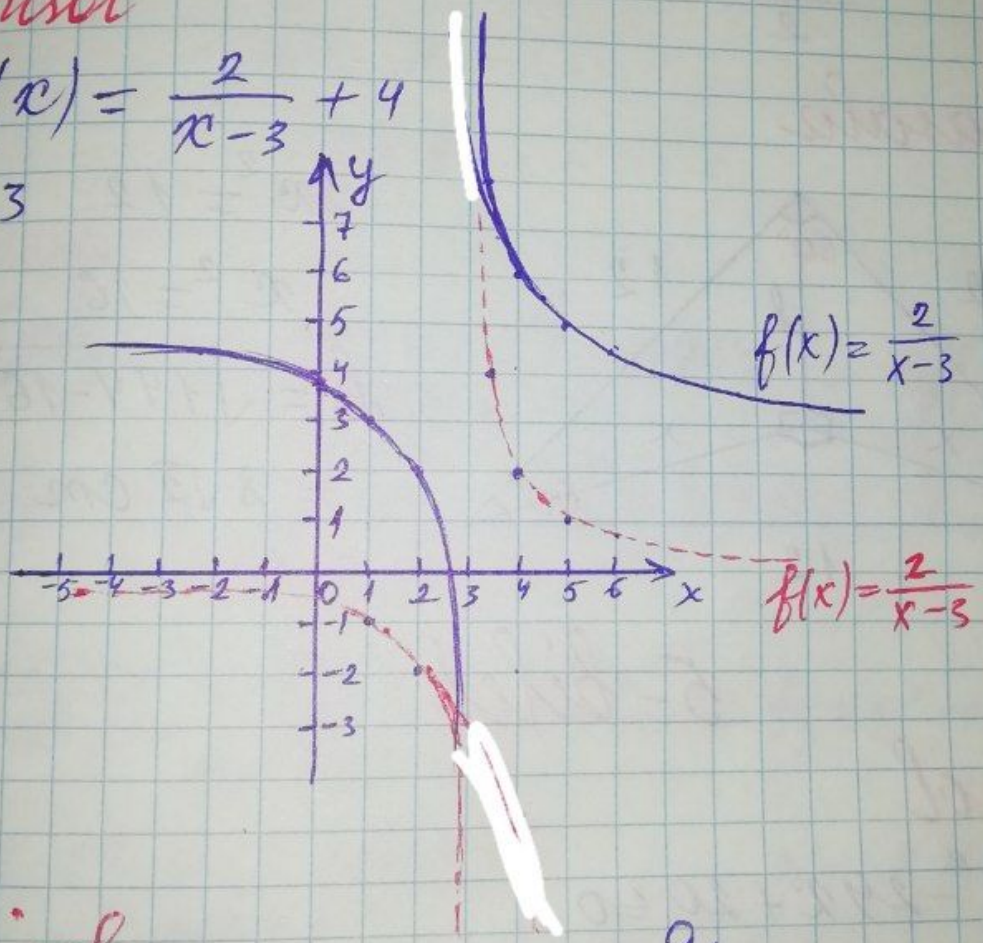
$$= \frac{5 \cdot 4}{2} \cdot \frac{4 \cdot 3}{2} \cdot \frac{4 \cdot 3}{2} = 10 \cdot 6 \cdot 6 = 360$$

360 xil usulda tayyorlasa bōladi.

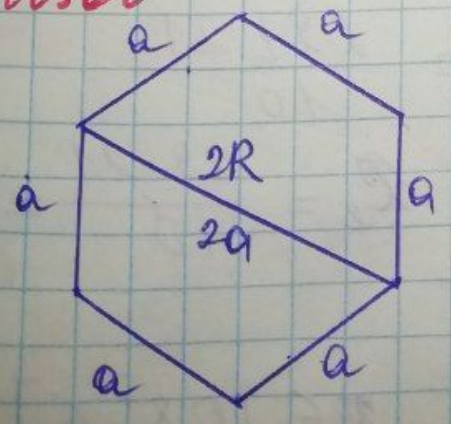
3-misol

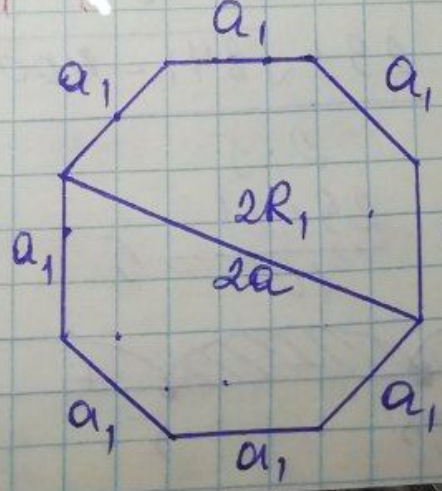
$$f(x) = \frac{2}{x-3} + 4$$

$x \neq 3$



4-misol





$$a_1 = \sqrt{2-\sqrt{2}} \cdot a$$

$$r = \frac{\sqrt{3} \cdot a}{2}$$

$$r_1 = \frac{\sqrt{2-\sqrt{2}} \cdot a}{2(\sqrt{2}-1)}$$

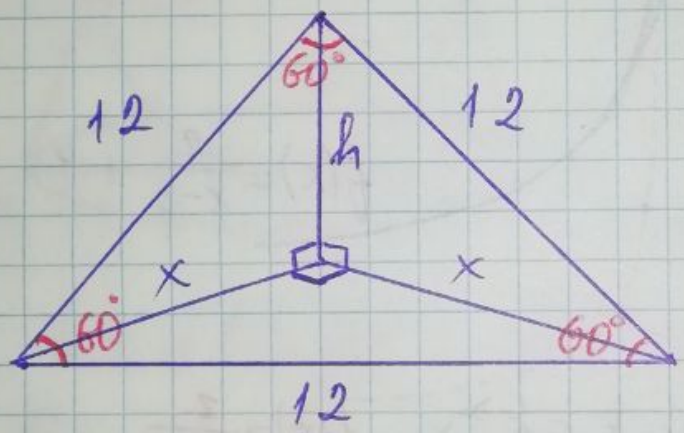
$$S_6 = \frac{P \cdot r}{2} = \frac{6a \cdot \sqrt{3} \cdot a}{2 \cdot 2} = \frac{3\sqrt{3}a^2}{2}$$

$$S_8 = \frac{P_1 \cdot r_1}{2} = \frac{8 \cdot \sqrt{2-\sqrt{2}} \cdot a \cdot \sqrt{2-\sqrt{2}} \cdot a}{2 \cdot 2(\sqrt{2}-1)} =$$

$$= \frac{2\sqrt{2}(\sqrt{2}-1)a^2}{\sqrt{2}-1} = 2\sqrt{2}a^2$$

$$\frac{S_8}{S_6} = \frac{2\sqrt{2}a^2}{\frac{3\sqrt{3}a^2}{2}} = \frac{4\sqrt{2}}{3\sqrt{3}} = \frac{4\sqrt{6}}{9}$$

5-masala



$$2x^2 = 12$$

$$x^2 = 16$$

$$h = \sqrt{144-16} = \sqrt{128} = 8\sqrt{2}\ cm$$

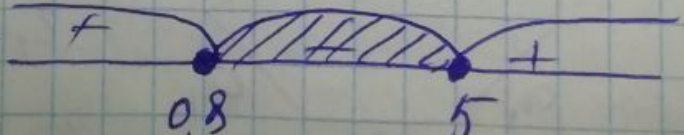
5-bilet

1-misol

$$5x^2 - 29x + 20 \le 0$$

$$x_{1,2} = \frac{29 \pm \sqrt{841-400}}{2 \cdot 5} = \frac{29 \pm 21}{10}$$

$$x_1 = \frac{29+21}{10} = 5 \qquad x_2 = \frac{29-21}{10} = 0{,}8$$



$$x \in [0{,}8;\ 5]$$

$$\frac{1+2+3+4+5}{5} = \frac{15}{5} = 3$$

2-misol

$$b_4 - 9b_2 + b_3 - 9b_1 = 0$$

$$b_3 + b_4 = 9(b_1 + b_2)$$

$$b_1 \cdot q^2(1+q) = 9b_1 \cdot (1+q)$$

$$b_1 \cdot q^2 = 9b_1$$

$$q^2 = 9$$

$$q = 3$$

3-misol

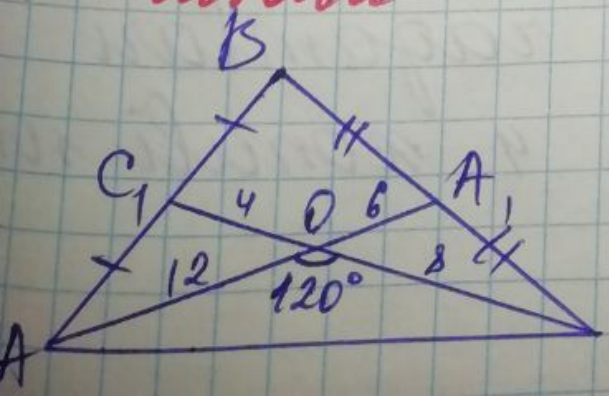
$$\frac{(ctg\,44^\circ + tg\,226^\circ) \cdot \cos 406^\circ}{\cos 316^\circ} + tg(-405^\circ) =$$

$$= \frac{(ctg\,44^\circ + tg(270^\circ - 44^\circ)) \cdot \cos(450^\circ - 44^\circ)}{\cos(360^\circ - 44^\circ)} + tg(-405^\circ) =$$

$$= \frac{(ctg\,44^\circ + ctg\,44^\circ) \cdot \sin 44^\circ}{\cos 44^\circ} - tg\,45^\circ =$$

$$= \frac{2 \cdot ctg\,44^\circ \cdot \sin 44^\circ}{\cos 44^\circ} - 1 = 2 - 1 = 1$$

4-masala



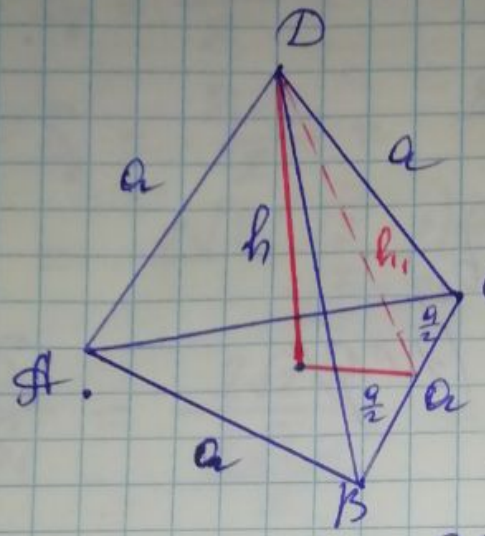
$AA_1 = 18$ sm

$CC_1 = 12$ sm

$$S_{ABC} = 3S_{AOC} = 3 \cdot \frac{8 \cdot 12}{2} \cdot \sin 120^\circ =$$

$$= 72\sqrt{3}\ sm^2$$

5-masala



Tetraedr — barcha qirralari teng, muntazam uchburchaklardan iborat bolgan piramida. Uning balandligi asosiga ichki chizilgan aylana markaziga tushadi.

$$r = \frac{a}{2\sqrt{3}} \qquad h_1 = \sqrt{a^2 - \frac{a^2}{2}} = \frac{\sqrt{3}\cdot a}{2}$$

$$h = \sqrt{h_1^2 - r^2} = \sqrt{\frac{3a^2}{4} - \frac{a^2}{12}} = \sqrt{\frac{9a^2 - a^2}{12}} =$$

$$= \sqrt{\frac{8a^2}{12}} = \frac{\sqrt{6}}{3}\cdot a$$

6-bilet

1-misol

0, 1, 3, 5, 7, 8

$5 \cdot 5 \cdot 4 \cdot 3 = 300$ ta raqamlari takrorlanmaydiga 4 xonali son yozish mumkin

2-misol

$$x^2 - ax + 20 = 0.$$

$$\frac{1}{x_1} + \frac{1}{x_2} = \frac{9}{20}$$

$$\frac{x_1 + x_2}{x_1 \cdot x_2} = \frac{9}{20}$$

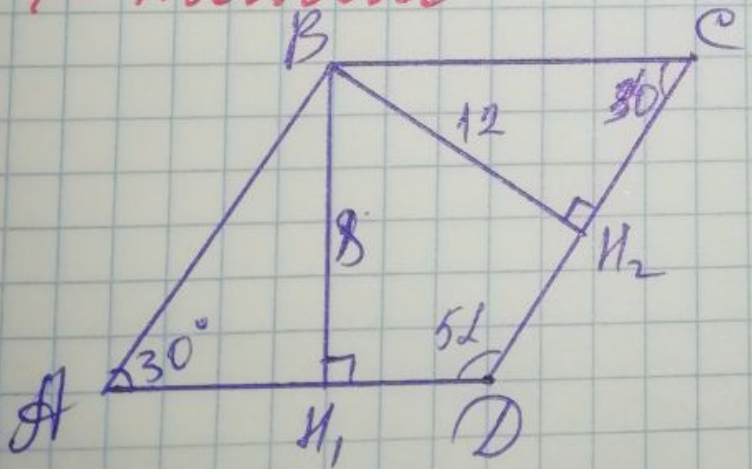
$$\frac{a}{20} = \frac{9}{20}$$

$$a = 9$$

3-misol

$$\sin\left(2 \arcsin \frac{1}{3}\right) = 2 \sin\left(\arcsin \frac{1}{3}\right) \cdot \cos\left(\arcsin \frac{1}{3}\right) = 2 \cdot \frac{1}{3} \cdot \sqrt{1 - \frac{1}{9}} = \frac{2}{3} \cdot \frac{2\sqrt{2}}{3} = \frac{4\sqrt{2}}{9}$$

4-masala



$$\alpha + 5\alpha = 180^\circ$$

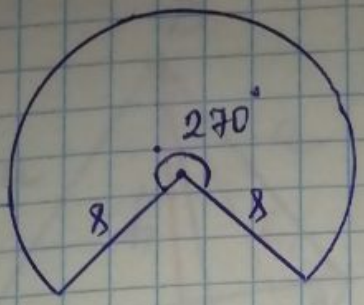
$$6\alpha = 180^\circ$$

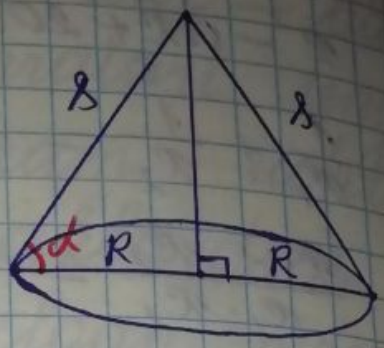
$$\alpha = 30^\circ$$

$$BC = 24$$

$$AB = 16$$

$$S_{ABCD} = \frac{1}{2} AB \cdot BC \cdot \sin 30^\circ = \frac{1}{2} \cdot 24 \cdot 16 \cdot \frac{1}{2} = 96 \text{ cm}^2$$





$$R = \frac{270° \cdot 8}{2 \cdot 180°} = 6 \qquad \cos\alpha = \frac{3}{4}$$

$$\sin\alpha = \frac{\sqrt{7}}{4}$$

$$R_{shar} = \frac{\sin\alpha}{1+\cos\alpha} \cdot R = \frac{\frac{\sqrt{7}}{4}}{1+\frac{3}{4}} \cdot 6 = \frac{6\sqrt{7}}{7}$$

7-bilet

1-misol

1 dan 75 gacha tub sonlar: 21 ta

Tavakkaliga olingan sharning tub bolish ehtimoli: $\frac{21}{75} = \frac{7}{25}$

2-misol

$f(x) = 8x^3 - 5 \qquad A(1;4)$

$$F(x) = \int (8x^3 - 5)dx = 2x^4 - 5x + C$$

$$2 \cdot 1 - 5 \cdot 1 + C = 4$$

$$C = 7$$

$$F(x) = 2x^4 - 5x + 7$$

3-misol

$$\log_3(x-2) - \log_{\frac{1}{\sqrt{3}}}\sqrt{x-4} = 1$$

$$\log_3(x-2) + 2\log_3\sqrt{x-4} = 1$$

$$\log_3(x-2) + \log_3(x-4) = 1$$

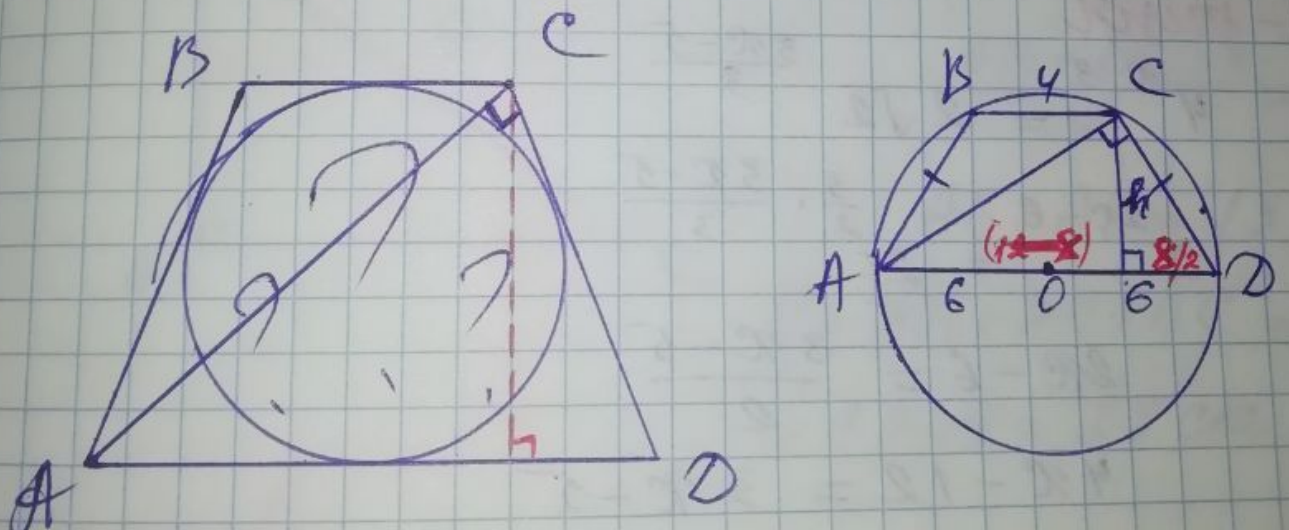
$$\log_3(x-2)\cdot(x-4) = 1$$

$$\begin{cases} (x-2)\cdot(x-4) = 3 \\ (x-2)(x-4) > 0 \end{cases} \rightarrow (x<2 \quad x>4)$$

$$x^2 - 6x + 5 = 0.$$

$$x_1 = 1 \quad x_2 = 5$$

4-masala

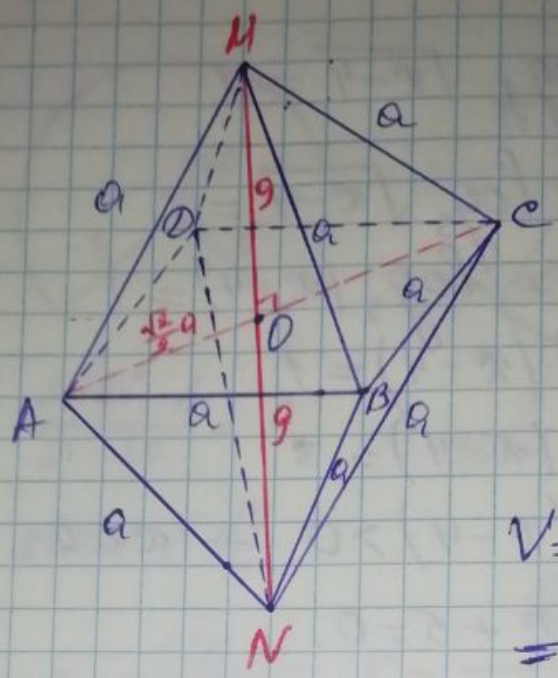


$$h^2 = 4 \cdot 8$$

$$h = 4\sqrt{2}$$

$$S_{ABCD} = \frac{12+4}{2} \cdot 4\sqrt{2} = 32\sqrt{2}$$

5-masala.



$MN = 18$

$AO = OC = \frac{\sqrt{2}}{2}a$

$V = 2V_p = \frac{2S_{ah}}{3}$

$a^2 - \frac{a^2}{2} = 81$

$a = 9\sqrt{2}$

$V = \frac{2 \cdot (9\sqrt{2})^2 \cdot 9}{3} =$

$= 2 \cdot 243 \cdot 2 = 972$

8-bilet

1-misol

$$4^{x-3} = 2\sqrt{2}^{\frac{3x-5}{3}}$$

$$2^{2x-6} = 2^{\frac{3}{2} \cdot \frac{3x-5}{3}}$$

$$2x - 6 = \frac{3x-5}{2}$$

$$4x - 12 = 3x - 5$$

$$x = 7$$

2-misol

$f(x) = 2 + 6 \cdot \cos^2(2x+2)$

$E \in [2; 8]$

32-m

3-misol

$$f(x) = \frac{2x+5}{x+1} \qquad x_0 = 2$$

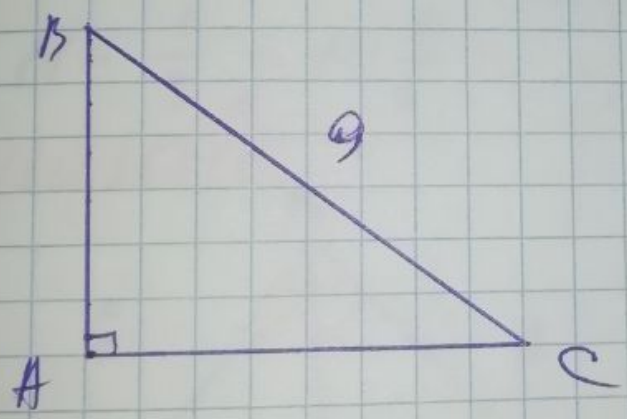
$y = f(x_0) + f'(x_0)\cdot(x - x_0)$ → urinma tenglamasi

$$f'(x) = \frac{2(x+1) - 2x - 5}{(x+1)^2} = \frac{-3}{(x+1)^2}$$

$$y = \frac{2\cdot 2+5}{2+1} + \frac{(-3)}{(2+1)^2}\cdot(x-2) = \frac{9}{3} - \frac{1}{3}(x-2) =$$

$$= \frac{11-x}{3}$$

4-misol



$$r = \frac{AB+AC-BC}{2} =$$

$$= \frac{AB+AC-9}{2} = 5$$

$$AB + AC = 19$$

$$P = AB + AC + BC =$$

$$= 19 + 9 = 28 \text{ cm}.$$

5-masala

$$S_{yon} = 60 \text{ cm}^2$$

$$R_{sh} = 3 \text{ cm}$$

9-bilet

1-misol

$S_{10} = 175$

$S_{20} = 325$ $\quad S_{30} = ?$

$$\begin{cases} \frac{2a_1 + 9d}{2} \cdot 10 = 175 \\ \frac{2a_1 + 19d}{2} \cdot 20 = 325 \end{cases}$$

$$\begin{cases} 2a_1 + 9d = 35 \quad | \cdot 2 \\ 2(2a_1 + 19d) = 65 \end{cases}$$

$$\begin{cases} 4a_1 + 18d = 70 \\ 4a_1 + 38d = 65 \end{cases}$$

$$20d = -5$$

$$d = -\frac{1}{4}$$

$$2a_1 - \frac{9}{4} = 35$$

$$a_1 = \frac{149}{8}$$

$$S_{30} = \frac{2 \cdot \frac{149}{8} - 29 \cdot \frac{1}{4}}{2} \cdot 30 = \frac{30 \cdot 30}{2} = 450$$

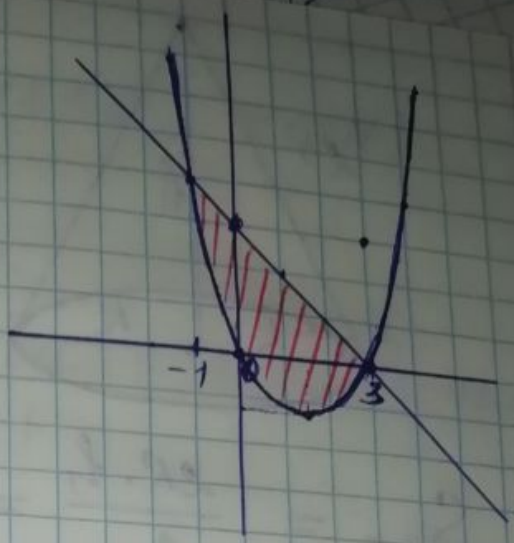
2-masala

$30 \cdot 29 \cdot 28 = 24360$ xil usulda tanlash mumkin

3-misol

$f(x) = x^2 - 3x$

$y = -x + 3$



$x^2 - 3x = -x + 3$

$x^2 + 2x - 3 = 0$

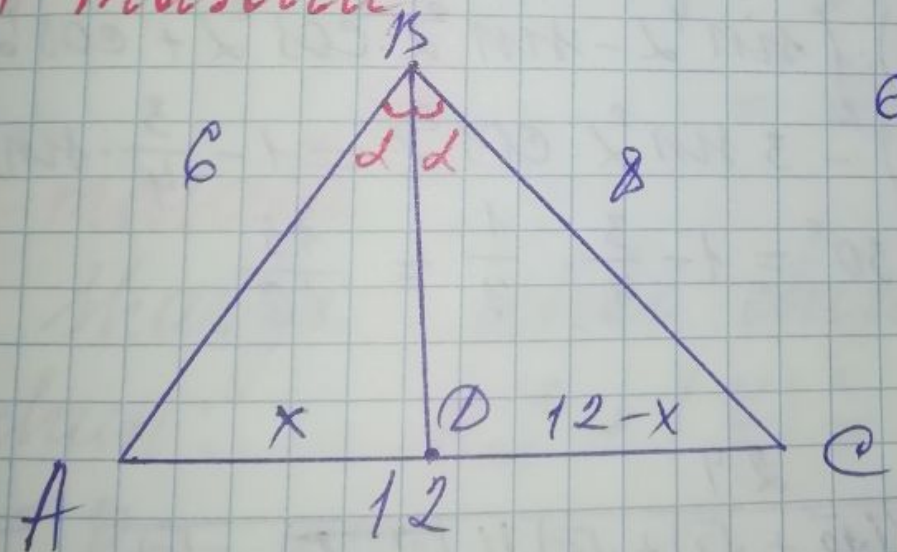
$x_1 = -1 \quad x_2 = 3$

$$\int_{-1}^{3} (-x + 3 - x^2 + 3x)\,dx = \int_{-1}^{3} (2x + 3 - x^2)\,dx =$$

$$= \left(x^2 + 3x - \frac{x^3}{3}\right)\Big|_{-1}^{3} = 9 + 9 - 9 - 1 + 3 - \frac{1}{3} =$$

$$= 11 - \frac{1}{3} = 10\frac{2}{3}$$

4-masala



$6 \cdot (12 - x) = 8 \cdot x$

$72 - 6x = 8x$

$14x = 72$

$x = \frac{36}{7}$

$AD = \frac{36}{7} = 5\frac{1}{7}$ cm

$DC = 12 - 5\frac{1}{7} = 6\frac{6}{7}$ cm.

5-masala

$l = 25$

$\sin\alpha = 0{,}6$

$\frac{h}{25} = \sin\alpha = 0{,}6$

$h = 15$

$R = \sqrt{625 - 225} = 20$

$S_{yan} = \frac{2R \cdot l}{2} = 20 \cdot 15 = 300$

10-bilet

1-misal

$\alpha = 15^\circ$

$\sin^6\alpha + \cos^6\alpha = (\sin^2\alpha)^3 + (\cos^2\alpha)^3 =$

$= (\sin^2\alpha + \cos^2\alpha) \cdot (\sin^4\alpha - \sin^2\alpha \cdot \cos^2\alpha + \cos^4\alpha) =$

$= (\sin^2\alpha + \cos^2\alpha)^2 - 3\sin^2\alpha \cdot \cos^2\alpha = 1 - \frac{3}{4} \cdot \sin^2 2\alpha =$

$= 1 - \frac{3}{4} \cdot \sin^2 30^\circ = 1 - \frac{3}{4} \cdot \frac{1}{4} = \frac{13}{16}$

2-misal

$$\frac{24}{\sqrt{2}+\sqrt{3}+\sqrt{5}} = \frac{24}{((\sqrt{2}+\sqrt{3})+\sqrt{5}) \cdot ((\sqrt{2}+\sqrt{3})-\sqrt{5})} =$$

$$= \frac{24}{(\sqrt{2}+\sqrt{3})^2 - (\sqrt{5})^2} = \frac{24}{5+2\sqrt{6}-5} =$$

$$= \frac{24}{2\sqrt{6}} = 2\sqrt{6}$$

3-misol

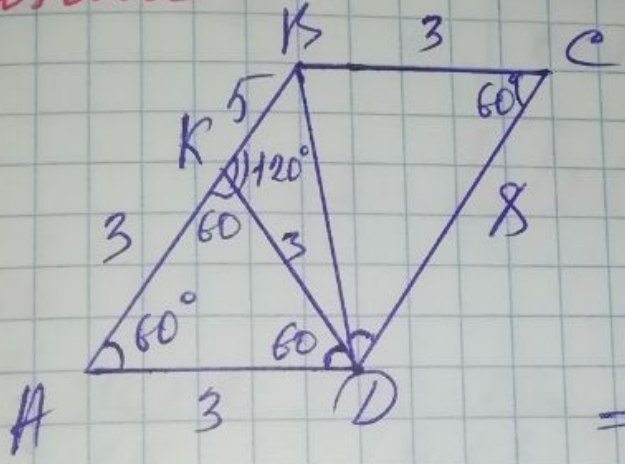
$A = \{ x \mid x^2 - 7x - 18 \le 0,\ x \in N \}$

$-2 \le x \le 9$

1, 2, 3, 4, 5, 6, 7, 8, 9

$9 \cdot 9 \cdot 9 \cdot 9 \cdot 9 = 9^5$ ta 5 xonali son tuzish mumkin!

4-masala



$S_{OKBC} = S_{OKB} + S_{OBC}$

$= \frac{1}{2}\left(5 \cdot 3 \cdot \frac{\sqrt{3}}{2} + 8 \cdot 3 \cdot \frac{\sqrt{3}}{2}\right) =$

$= \frac{1}{2}\left(\frac{15\sqrt{3}}{2} + \frac{24\sqrt{3}}{2}\right) =$

$= \frac{39\sqrt{3}}{4}$

5-masala

Sharga ichki chizilgan prizma uchun: $R_{as}^2 + \left(\frac{H}{2}\right)^2 = R_{sh}^2$

$R_{sh} = 12$

$H = 8.$

$R_{as} = \sqrt{R_{sh}^2 - \left(\frac{H}{2}\right)^2} = \sqrt{144 - 16} = 8\sqrt{2}$

$\frac{a}{\sqrt{3}} = 8\sqrt{2} \qquad a = 8\sqrt{6}$

11-bilet

1-misol

$f(x) = e^{2x-4} + 2\ln x, \quad x_0 = 2$

$f'(x) = 2 \cdot e^{2x-4} + \frac{2}{x}$

$f'(x_0) = 2 \cdot e^{2\cdot 2-4} + \frac{2}{2} = 2 + 1 = 3$

2-misol

$3^{x+2} = \frac{1}{\sqrt{3}}$

$3^{x+2} = 3^{-\frac{1}{2}}$

$x + 2 = -\frac{1}{2}$

$x = -2,5$

3-misol

$3\arcsin\left(-\frac{1}{2}\right) - 6(\arccos\left(-\frac{1}{2}\right)) = -3 \cdot \frac{\pi}{6} -$

$-6\left(\pi - \frac{\pi}{3}\right) = -\frac{\pi}{2} - 4\pi = -4,5\pi$

4-misol

$\vec{m}(2; 3; x), \quad \vec{n}(-1; 4; 2)$

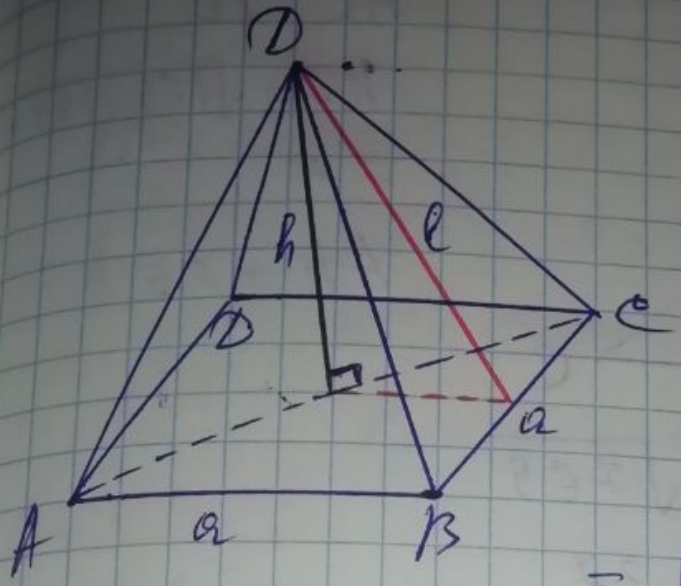
$\vec{m} \perp \vec{n} \qquad x = ?$

$2 \cdot (-1) + 3 \cdot 4 + 2 \cdot x = 0.$

$10 + 2x = 0$

$x = -5$

5-masala



$N = 9200$

$h = 9$

$\frac{1}{3} \cdot S_{as} \cdot 9 = 9200$

$S_{as} = a^2 = \frac{9200}{3}$

$l = \sqrt{h^2 + \frac{a^2}{4}} =$

$= \sqrt{81 + \frac{2300}{3}} = \sqrt{\frac{2543}{3}}$

12-bilet

1-misol

$$\frac{a^2+3a+2}{a^2-25} \cdot \frac{10-2a}{a+2} = \frac{-(a+1)(a+2) \cdot 2(a-5)}{(a-5)(a+5)\cdot(a+2)} =$$

$$= -\frac{a+1}{a+5}$$

2-misol

$$\begin{cases} 2^{x+y} = 32 \\ 3^{3y-x} = 27 \end{cases}$$

$$\begin{cases} x+y=5 \\ 3y-x=3 \end{cases}$$

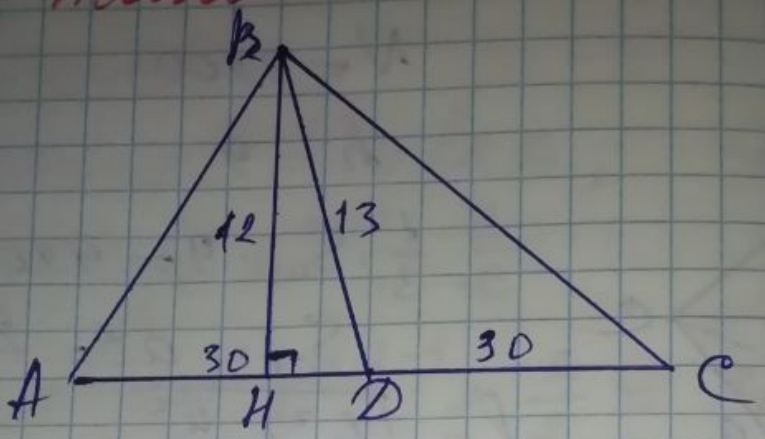
$4y = 8$

$y = 2$

$x = 3$

Javob: $(3; 2)$

4-masala



$AC = 60$

$HD = \sqrt{169 - 144} = 5$

$AH = 25$

$AB = \sqrt{144 + 625} = \sqrt{769}$

$BC = \sqrt{144 + 1225} = 37$

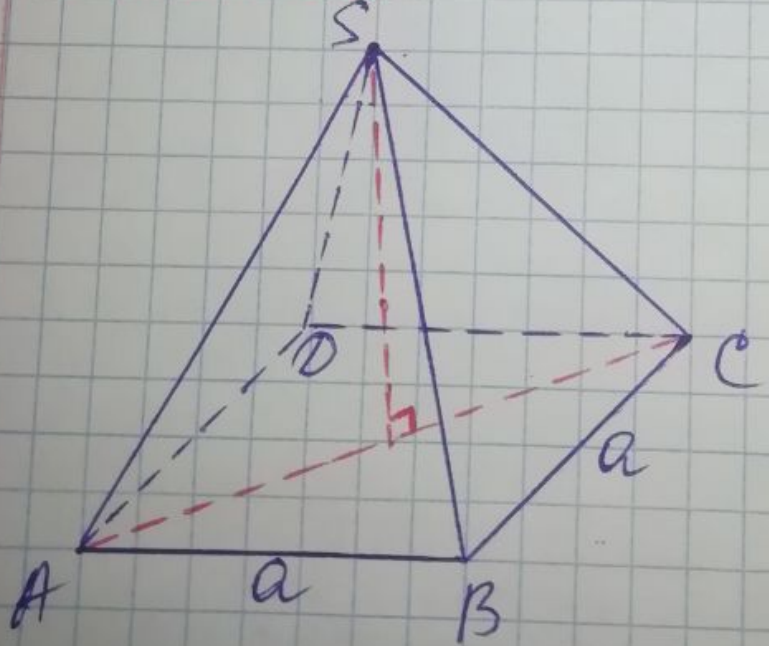
3-misol

$$f(x) = \sqrt[3]{2x-1} \cdot (2x-3)^3$$

$$f'(x) = \left(\sqrt[3]{2x-1}\right)' \cdot (2x-3)^3 + \left((2x-3)^3\right)' \cdot \sqrt[3]{2x-1} =$$

$$= \frac{2(2x-3)^3}{3\sqrt[3]{(2x-1)^2}} + 6(2x-3)^2 \cdot \sqrt[3]{2x-1}$$

5-masala



$S_{ACS} = 54$

$h = 9$

$V_p = ?$

$$\frac{AC \cdot h}{2} = 54$$

$AC = 12$

$$V_p = \frac{1}{3} \cdot \frac{12 \cdot 12}{2} \cdot 9 = 216$$

13-bilet

1-misol

$$f(x) = 2x^3 - 15x^2 + 36x$$

$$f'(x) = 6x^2 - 30x + 36 = 0$$

$$x^2 - 5x + 6 = 0$$

$$x_1 = 2 \qquad x_2 = 3$$

2-misol

$$x = 2$$

$$\frac{x+\sqrt{3}}{\sqrt{x}+\sqrt{x+\sqrt{3}}} + \frac{x-\sqrt{3}}{\sqrt{x}-\sqrt{x-\sqrt{3}}} = \frac{(x+\sqrt{3})(\sqrt{x}-\sqrt{x+\sqrt{3}})}{(\sqrt{x}+\sqrt{x+\sqrt{3}})(\sqrt{x}-\sqrt{x+\sqrt{3}})}$$

$$+ \frac{(x-\sqrt{3})\cdot(\sqrt{x}+\sqrt{x-\sqrt{3}})}{(\sqrt{x}-\sqrt{x-\sqrt{3}})(x+\sqrt{x-\sqrt{3}})} = -\frac{(2+\sqrt{3})(\sqrt{2}-\sqrt{2+\sqrt{3}})}{\sqrt{3}} +$$

$$+ \frac{(2-\sqrt{3})(\sqrt{2}+\sqrt{2-\sqrt{3}})}{\sqrt{3}} = \frac{-2\sqrt{6}+(2+\sqrt{3})^{\frac{3}{2}}+(2-\sqrt{3})^{\frac{3}{2}}}{\sqrt{3}} =$$

$$= \frac{-2\sqrt{6}+(\sqrt{2+\sqrt{3}}+\sqrt{2-\sqrt{3}})\cdot(4-1)}{\sqrt{3}} = \frac{-2\sqrt{6}+3\sqrt{6}}{\sqrt{3}} =$$

$$= \sqrt{2}$$

3-misol

$$3^{2x} - 2\cdot 3^{2x-1} - 2\cdot 3^{2x-2} = 1$$

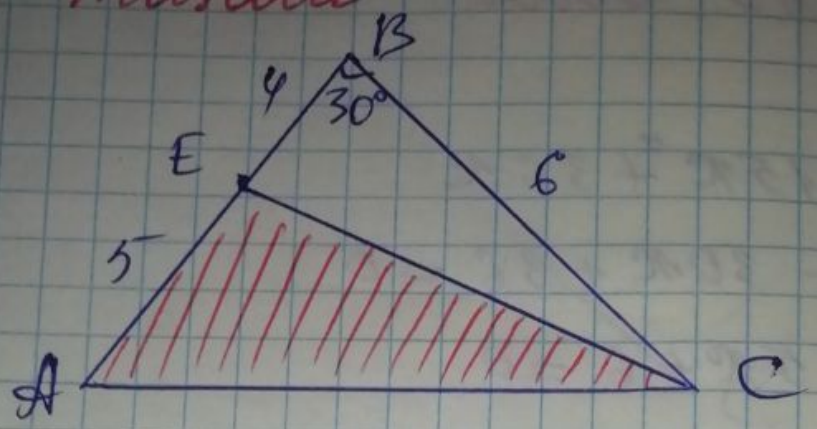
$$3^{2x-2}(9 - 6 - 2) = 1$$

$$3^{2x-2} = 1$$

$$2x - 2 = 0$$

$$x = 1$$

4-masala



$BE=4$

$EA=5$

$BC=6$

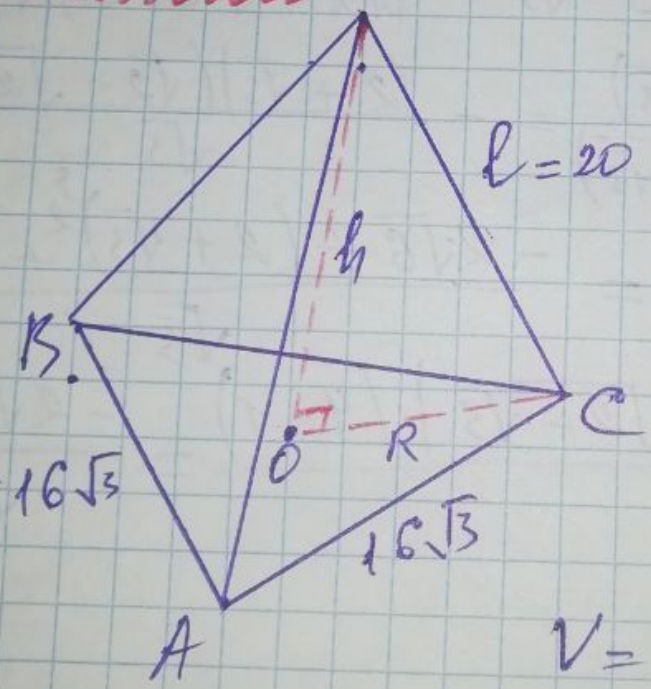
$\angle CBE=30°$

$S_{AEC}=?$

$S_{AEC}=S_{ABC}-S_{BEC}=\frac{1}{2}\cdot\sin 30°\cdot(6\cdot 9-6\cdot 4)=$

$=\frac{1}{2}\cdot\frac{1}{2}\cdot 6\cdot 5=7,5$

5-masala



$l=20$

$a=16\sqrt{3}$

$R=\frac{a}{\sqrt{3}}=16$

$h=\sqrt{l^2-R^2}=\sqrt{400-256}=$

$=12$

$V=\frac{1}{3}\cdot S_{os}\cdot h=\frac{1}{3}\cdot\frac{\sqrt{3}\cdot 16\cdot 3}{4}\cdot 12=$

$=48\sqrt{3}.$

14-bilet

1-misol

$\log_{15}(x-3)+\log_{15}(x-5)<1$

$\log_{15}(x-3)\cdot(x-5) < 1$

$\begin{cases} (x-3)\cdot(x-5) < 15 \\ (x-3)\cdot(x-5) > 0 \end{cases} \rightarrow (x<3;\ x>5)$

$x^2 - 8x + 15 < 15$

$x(x-8) < 0$

$0 < x < 8$

$x \in (0;3) \cup (5;8)$

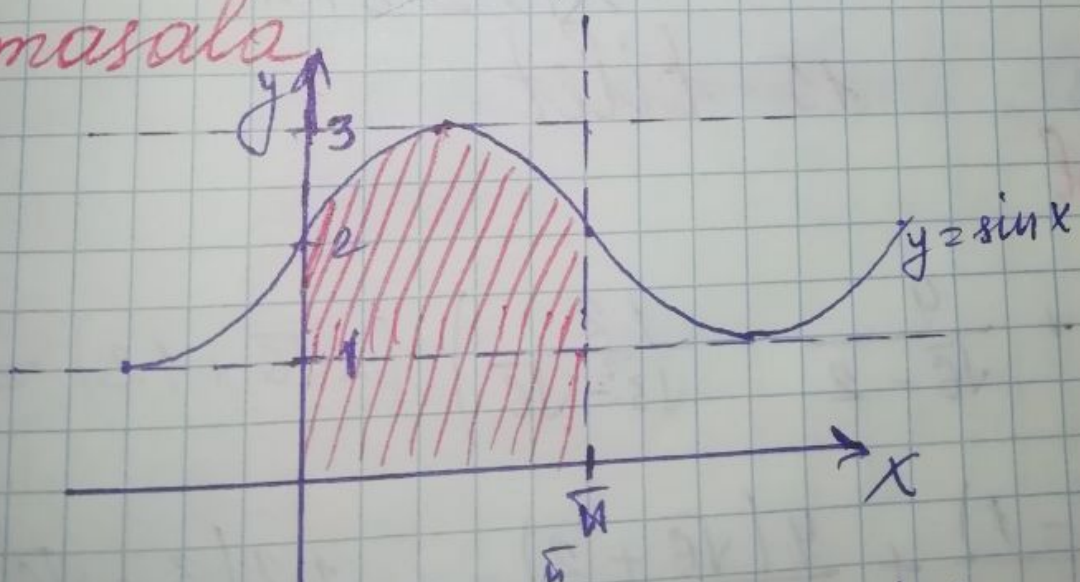
2-misol

$$\left(2+\frac{1}{b}\right) : \frac{8b^2+8b+2}{b^2-4b} \cdot \frac{2b+1}{b} =$$

$$= \frac{2b+1}{b} : b(1-2b)\cdot(1+2b)$$

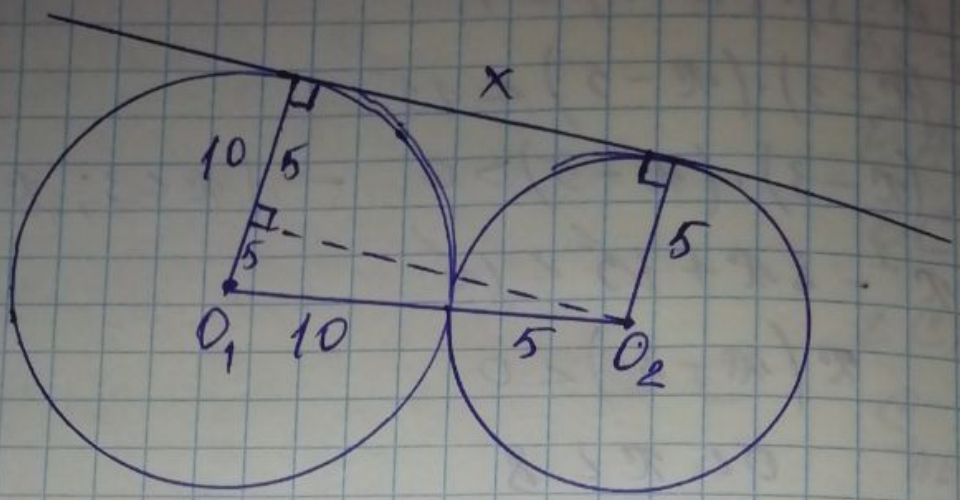
$$= \frac{2b+1}{b} \cdot \frac{b(b-4)}{2(2b+1)^2} \cdot \frac{2b+1}{b} = \frac{b-4}{2b}$$

3-masala



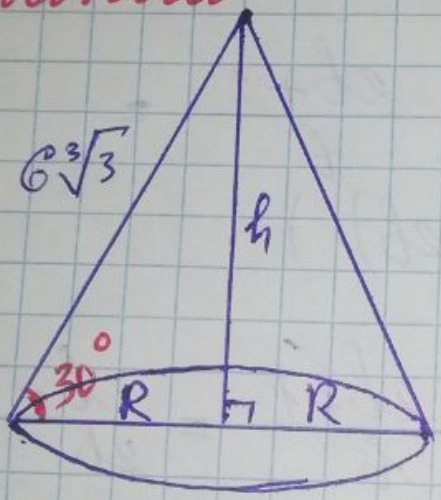
$$S = \int_0^{\pi} (2+\sin x)\,dx + \pi = \pi +$$

$$+ (2x - \cos x)\Big|_0^{\pi} = \pi + 2\pi + 1 - 1 = 3\pi$$



$$x = \sqrt{15^2 - 5^2} = \sqrt{225 - 25} = 10\sqrt{2}$$

5-masala



$$h = \frac{6\sqrt[3]{3}}{2} = 3\sqrt[3]{3}.$$

$$R = 3\sqrt[6]{3^5}$$

$$V_k = \frac{1}{3} \cdot \pi R^2 h = \frac{1}{3} \cdot \pi \cdot 27\sqrt[3]{9} \cdot 3\sqrt[3]{3} = 81\pi$$

15-bilet

1-misol

$$\left(\frac{20}{\sqrt{6}+1} + \frac{4}{\sqrt{6}-2} - \frac{12}{\sqrt{3^2}\sqrt{6}}\right) \cdot (2\sqrt{6}+12) =$$

$$= \left(\frac{20(\sqrt{6}-1)}{6-1} + \frac{4(\sqrt{6}+2)}{6-4} + \frac{12(3+\sqrt{6})}{3}\right) \cdot (2\sqrt{6}+12) = (4\sqrt{6} - 4 + 2\sqrt{6} + 4 - 12 - 4\sqrt{6}) \cdot$$

$\cdot(2\sqrt{6}+12) = (2\sqrt{6}-12)(2\sqrt{6}+12) = 12$

2-misol

$(\log_3 x)^2 + 5 = 2\log_3 x^3$

$\log_3 x = t.$

$t^2 - 6t + 5 = 0.$

$t_1 = 1 \quad t_2 = 5$

$\log_3 x = 1 \qquad \log_3 x = 5$

$x_1 = 3 \qquad x_2 = 243$

3-masala

$x \cdot 3 - (36 - x) \cdot 2 = 88$

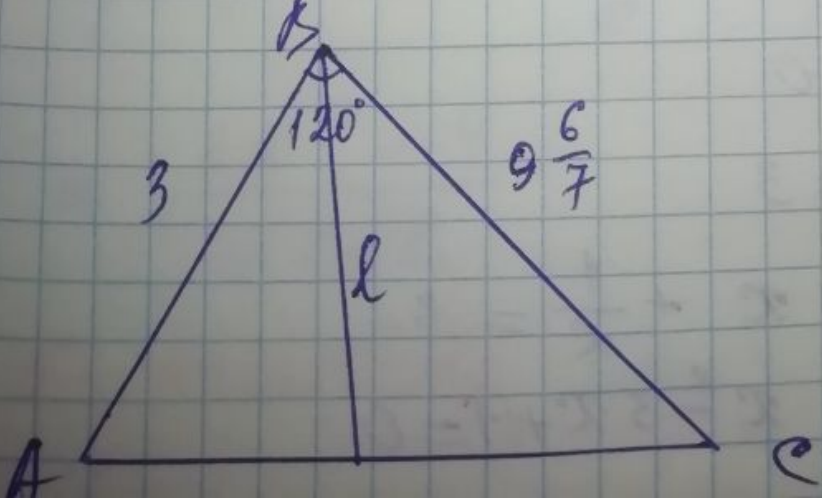
$3x + 2x - 72 = 88$

$5x = 160$

$x = 32$

Javob: 32 ta masalani tõgri yechishi kerak.

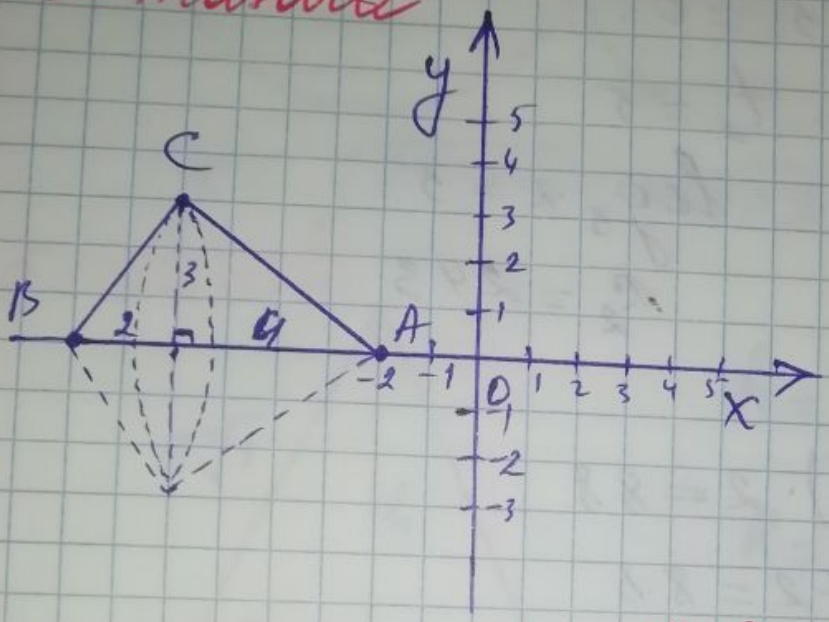
4-masala



$$l = \frac{2ab\cos\frac{\angle}{2}}{a+b} = \frac{2\cdot 3\cdot 9\frac{6}{7}\cdot \cos 60^\circ}{3+9\frac{6}{7}} =$$

$$= \frac{3\cdot\frac{69}{7}}{3+\frac{69}{7}} = \frac{207}{90} = 2\frac{27}{90} = 2\frac{3}{10}$$

5-masala



$$V = \frac{1}{3}\cdot\pi\cdot 9\cdot(2+4) =$$

$$= 18\pi$$

16-bilet.

1-misol

$$\left(x^2+\frac{1}{x^2}\right) - 4\left(x+\frac{1}{x}\right) + 5 = 0. \qquad x \neq 0$$

$$x+\frac{1}{x} = t.$$

$$t^2 - 2 - 4t + 5 = 0$$

$$t^2 - 4t + 3 = 0$$

$$t_1 = 1 \quad t_2 = 3$$

$$x+\frac{1}{x} = 1 \qquad x+\frac{1}{x} = 3$$

$$x^2 - x + 1 = 0 \qquad x^2 - 3x + 1 = 0$$

$$D < 0 \quad \emptyset$$

7: Tenglamaning ildizlari ko'paytmasi 1 ga teng.

2-misol

$$\begin{cases} \lg x + \lg y = 4 \\ x^{\lg y} = 1000 \end{cases}$$

$$\begin{cases} \lg x + \lg y = 4 \\ \lg x \cdot \lg y = 3 \end{cases}$$

$$\begin{cases} \lg x = 3 \\ \lg y = 1 \end{cases} \qquad \begin{cases} \lg y = 3 \\ \lg x = 1 \end{cases}$$

$x_1 = 1000$ $\qquad$ $x_2 = 10$

$y_1 = 10$ $\qquad$ $y_2 = 1000$

Javob: $(1000; 10)$, $(10; 1000)$

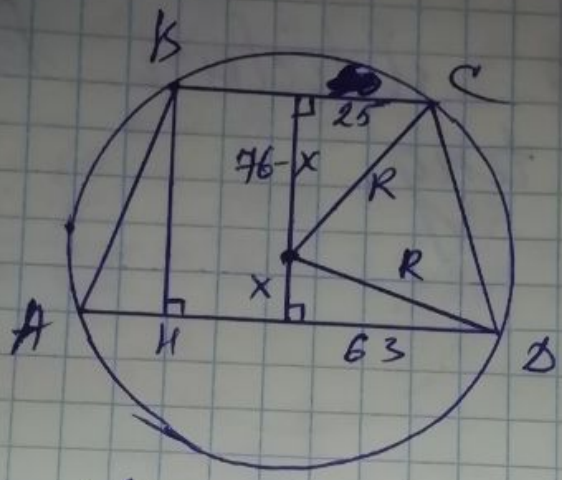
3-misol

$$f(x) = \frac{x^2 - 4}{\sqrt{x}}$$

$$f'(x) = \frac{\sqrt{x} \cdot 2x - \frac{x^2 - 4}{2\sqrt{x}}}{x} = \frac{4x^2 - x^2 + 4}{2 \cdot x\sqrt{x}} =$$

$$= \frac{3x^2 + 4}{2x\sqrt{x}}$$

5-masala



$AD = 126$

$BC = 50$

$h = 76$

$(76-x)^2 + 25^2 = x^2 + 63^2$

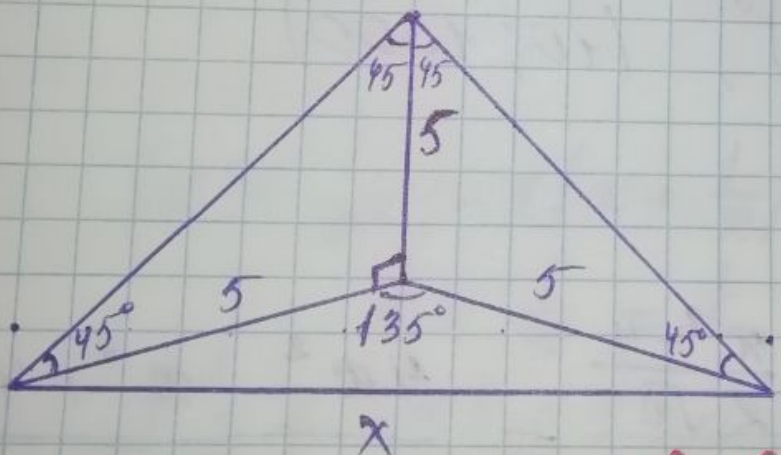
$5776 - 152x + x^2 + 625 = x^2 + 3969$

$152x = 2432$

$x = 16$

$R = \sqrt{256 + 3969} = \sqrt{4225} = 65$

5-masala



$x = \sqrt{25 + 25 + 2 \cdot \frac{\sqrt{2}}{2} \cdot 25} =$

$= \sqrt{50 + 25\sqrt{2}} =$

$= \sqrt{25(2+\sqrt{2})} =$

$= 5 \cdot \sqrt{2+\sqrt{2}}$

17-bilet

1-misol

$b_1 = 0{,}75$

$b_5 = 192$ $\quad S_5 = ?$

$b_1 \cdot q^4 = 192$

$q^4 = 256$

$q = 4$

$$S_5 = \frac{\frac{3}{4} \cdot (1 - 4^5)}{1 - 4} = \frac{4^5 - 1}{4} = \frac{1023}{4} = 255\frac{3}{4}$$

2-misol

$$\frac{tg\alpha + tg\beta}{ctg\alpha + ctg\beta} = \frac{\frac{\sin\alpha}{\cos\alpha} + \frac{\sin\beta}{\cos\beta}}{\frac{\cos\alpha}{\sin\alpha} + \frac{\cos\beta}{\sin\beta}} =$$

$$= \frac{\frac{\sin\alpha \cdot \cos\beta + \cos\alpha \cdot \sin\beta}{\cos\alpha \cdot \cos\beta}}{\frac{\cos\alpha \cdot \sin\beta + \sin\alpha \cdot \cos\beta}{\sin\alpha \cdot \sin\beta}} = tg\alpha \cdot tg\beta$$

3-misol

$\sin 2x = \cos^2 x$

$2\sin x \cos x - \cos^2 x = 0.$

$\cos x (2\sin x - \cos x) = 0.$

$\cos x = 0.$

$x = \frac{\pi}{2} + \pi k \quad (k \in Z)$

$2\sin x = \cos x$

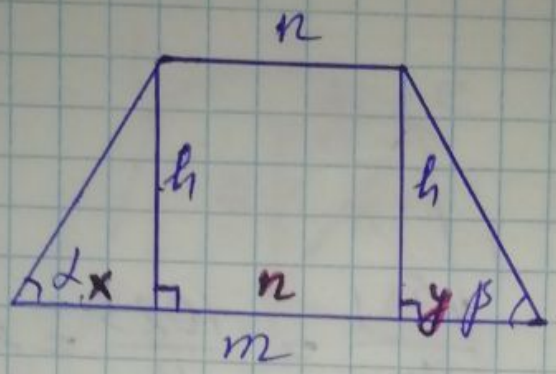
$tg x = \frac{1}{2}$

$x = arctg\frac{1}{2} + \pi k$

$\cos x \neq 0.$

$x \neq \frac{\pi}{2} + \pi k.$

4-masala



$$S_t = \frac{m+n}{2} \cdot h$$

$h = x\operatorname{tg}\alpha = y\operatorname{tg}\beta$

$x + y + n = m$

$$\frac{y \cdot \operatorname{tg}\beta}{\operatorname{tg}\alpha} + y = m - n$$

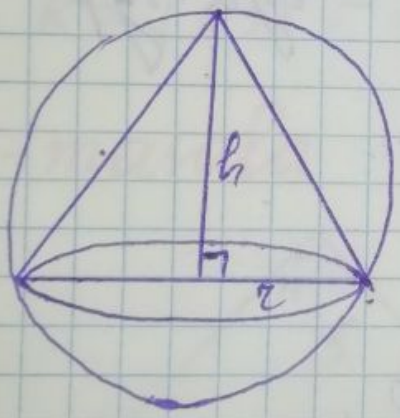
$$y\left(\frac{\operatorname{tg}\alpha + \operatorname{tg}\beta}{\operatorname{tg}\alpha}\right) = m - n$$

$$y = \frac{(m-n)\cdot \sin\alpha \cdot \cos\beta)}{\sin(\alpha+\beta)}$$

$$h = y\operatorname{tg}\beta = \frac{\sin\alpha \cdot \sin\beta \cdot (m-n)}{\sin(\alpha+\beta)}$$

$$S = \frac{m+n}{2} h = \frac{(m^2-n^2)\cdot \sin\alpha \cdot \sin\beta}{2\sin(\alpha+\beta)}$$

5-misol



$R_{shar} = 15$

$h = 12$

$r = \sqrt{R_{sh}^2 - (h - R_{sh})^2} = 12$

$V = \frac{1}{3} \cdot S_{as} \cdot h = \frac{1}{3} \cdot \pi r^2 \cdot h = 576\pi$

18-bilet

1-misol

$$\int_{-2}^{1} (x^2 + 2x + 3)\,dx = \left(\frac{x^3}{3} + x^2 + 3x\right)\Big|_{-2}^{1} =$$

$$= \frac{1}{3} + 1 + 3 + \frac{8}{3} - 4 + 6 = 9$$

2-misol

$$2^{2\sqrt{2x-4}} = 2^{6+\sqrt{2x-4}}$$

$$2\sqrt{2x-4} = 6 + \sqrt{2x+4}$$

$$\sqrt{2x-4} = 4$$

$$2x-4 = 16$$

$$x = 10$$

3-misol

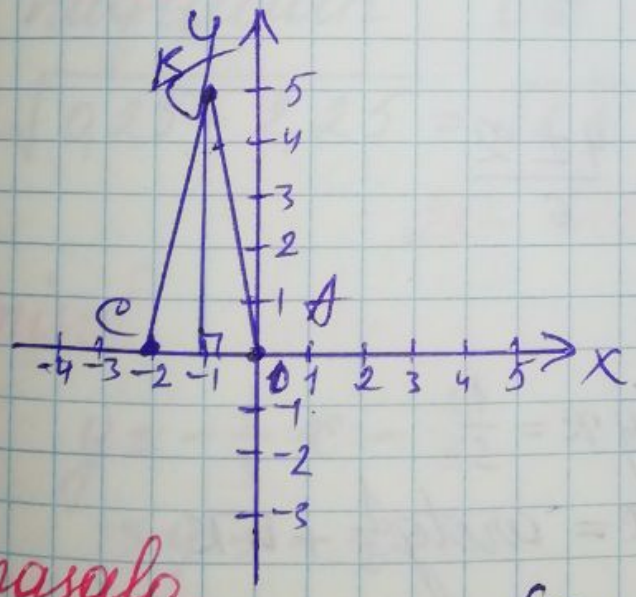
$$f(x) = e^{2x} - 2e^{x}$$

$$f'(x) = 2e^{2x} - 2e^{x} = 0.$$

$$2e^{x}(e^{x} - 1) = 0.$$

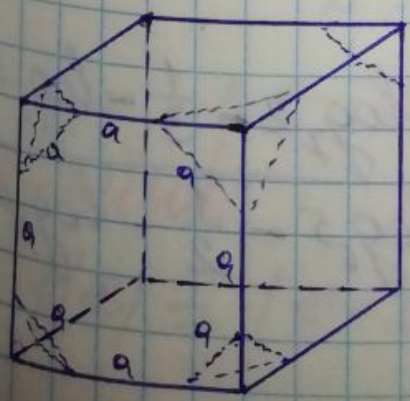
$$x = 0$$

4-masala



$$S_{ABC} = \frac{1}{2} \cdot 2 \cdot 5 = 5$$

5-masala



$$(\sqrt{2}+1)a = \sqrt{2}+1$$

$$a = 1$$

$$R_{\triangle} = \frac{1}{2\sqrt{3}} \qquad h = \sqrt{\frac{1^2}{2} - \frac{1}{3}} = \frac{1}{\sqrt{6}}$$

$$V_j = V_k - 8V_p = 1 - 8 \cdot \frac{1}{3} \cdot \sqrt{3}$$

$$V_j = (\sqrt{2}+1)^3 - 8 \cdot \frac{1}{3} \cdot \frac{\sqrt{3}}{4} \cdot \frac{1}{\sqrt{6}} = (\sqrt{2}+1)^3 - \frac{\sqrt{2}}{3}$$

19-bilet

1-misol

$$S(t) = t^2 + 3t$$

$$v(t) = S'(t) = 2t + 3$$

$$2t + 3 = 15$$

$$2t = 12$$

$$t = 6s$$

2-misol

$$3\operatorname{tg}^2 x - 4\operatorname{tg} x + 1 = 0.$$

$$\operatorname{tg} x = t$$

$$3t^2 - 4t + 1 = 0$$

$$t_{1,2} = \frac{4 \pm \sqrt{16 - 12}}{6} = \frac{4 \pm 2}{6}$$

$$t_1 = 1 \qquad t_2 = \frac{1}{3}$$

$$\operatorname{tg} x = 1 \qquad \operatorname{tg} x = \frac{1}{3}$$

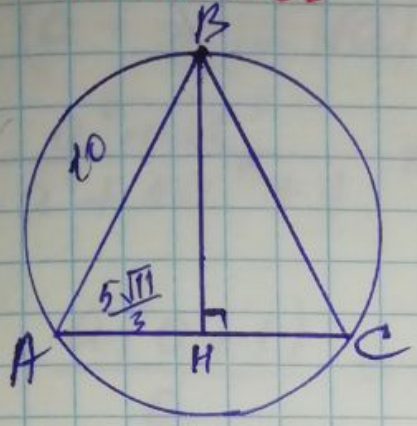
$$x = \frac{\pi}{4} + \pi k \qquad x = \operatorname{arctg}\frac{1}{3} + \pi \cdot k$$

3-misol

$$\frac{\log_7 14 - \frac{1}{3}\log_7 56}{\log_6 30 - \frac{1}{2}\log_6 150} = \frac{1 + \log_7 2 - \frac{1}{3} - \log_7 2}{1 + \log_6 5 - \frac{1}{2} - \log_6 5} =$$

$$= \frac{\frac{2}{3}}{\frac{1}{2}} = \frac{4}{3} = 1\frac{1}{3}$$

4- masala



$$R = \frac{AB^2}{2BH}$$

$$BH = \sqrt{100 - \frac{275}{9}} = \frac{25}{3}$$

$$R = \frac{100}{\frac{50}{3}} = 6$$

Javob: Aylananing radiusi 6 ga teng.

5- misol

$A(-6; 8; 4)$, $B(4; -7; 1)$

$$C\left(\frac{-6+4}{2}; \frac{8-7}{2}; \frac{4-1}{2}\right) = (-1; 0,5; 1,5)$$

C nuqtadan Ox o'qigacha masofa:

$$CO = \sqrt{0,25 + 2,25} = \sqrt{2,5}$$

20- bilet

1- misol

$$y = -\frac{1}{3}x - \frac{2}{3}$$

$$3y = -x - 2$$

$$x = -3y - 2$$

$$y_1 = -3x - 2$$

2- misol

$$f(x) = (x+2)\cdot\sqrt[3]{x}$$

$$f'(x) = \sqrt[3]{x} + \frac{x+2}{3\cdot\sqrt[3]{x^2}}$$

3-misol

$$(x^2-4)\cdot \log_{0,5} x > 0$$

$$\begin{cases} x < 1 \\ x < -2 \quad x > 2 \end{cases}$$

4-masala

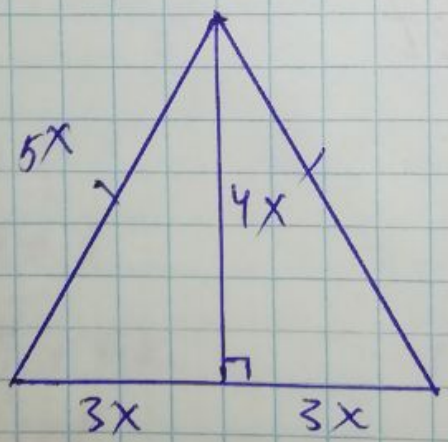
$$S_{18} = 4$$

$$\pi r^2 = \pi$$

$$r = 1$$

$$S_{18} = \frac{P_{18}\cdot 2}{2} \qquad P_{18} = 8$$

5-masala



$$\frac{1}{3}\cdot \pi \cdot 9x^2 \cdot 4x = 96\pi$$

$$x^3 = 8$$

$$x = 2$$

$$R = 6$$

$$l = 10$$

$$S_t = \pi R(R+l) = \pi \cdot 6 \cdot (6+10) = 96\pi$$

21-bilet

1-misol

$\left(a+\frac{1}{a}\right)^2=(\sqrt{a})^2 \qquad \left(a+\frac{1}{a}\right)^2=a$

$$\frac{a^4+a^3}{a^4+2a^2+1}=\frac{a^3\cdot(a+1):a^2}{(a^2+1)^2:a^2}=\frac{a(a+1)}{\left(a+\frac{1}{a}\right)^2}=$$

$$=\frac{a(a+1)}{a}=a+1.$$

2-misol

$$\log_3 x+2\log_x 3=3$$

$$\log_3 x+\frac{2}{\log_3 x}=3$$

$$\log_3^2 x-3\log_3 x+2=0.$$

$\log_3 x=t.$

$t^2-3t+2=0$

$t_1=1 \quad t_2=2$

$\log_3 x=1 \qquad \log_3 x=2$

$x_1=3 \qquad x_2=9.$

3-misol $[-2;2]$

$f(x)=x^3-6x^2+9$

$f'(x)=3x^2-12x=0$

$x_1=0 \quad x_2=4$

$f(0) = 9$

$f(4) = -21$

$f(-2) = -21$

$f(2) = -7$

Eng katta qiymati: 9

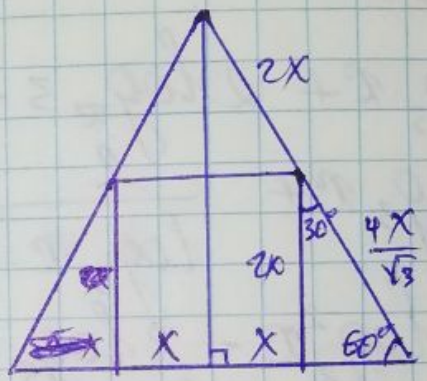
Eng kichik qiymati: -21

4-masala

$S = 25\sqrt{3}$

$\frac{\sqrt{3} \cdot a^2}{4} = 25\sqrt{3}$

$a = 10$



$2x + \frac{4x}{\sqrt{3}} = 10$

$x\left(1 + \frac{2}{\sqrt{3}}\right) = 5$

$x = \frac{5\sqrt{3}}{\sqrt{3}+2} = 5\sqrt{3}\cdot(2-\sqrt{3}) = 10\sqrt{3} - 15$

$P_k = 8x = 40(2\sqrt{3} - 3)$

5-masala

$2\pi R h = 24\pi$

$\pi R^2 \cdot h = 48\pi$

$R \cdot h = 12$

$R^2 \cdot h = 48$

$R = 4$

$h = 12 : 4 = 3.$

22-bilet

1-misol

$$\sqrt{6-\sqrt{32}}-\sqrt{6+\sqrt{32}}=\sqrt{6-4\sqrt{2}}-\sqrt{6+4\sqrt{2}}=$$

$$=2-\sqrt{2}-2-\sqrt{2}=-2\sqrt{2}.$$

2-masala

$$\begin{cases}\frac{M+F}{38+X}=40\\ \frac{M}{38}=35 \qquad M=1330\\ \frac{F}{X}=50 \qquad F=50x\end{cases}$$

$$1330+50x=1520+40x$$

$$10x=190$$

$$x=19 \text{ ta}$$

3-misol

$$\int_1^5 |x-3|\,dx=\int_1^3 (3-x)\,dx+\int_3^5 (x-3)\,dx=$$

$$=\left(3x-\frac{x^2}{2}\right)\Big|_1^3+\left(\frac{x^2}{2}-3x\right)\Big|_3^5=9-\frac{9}{2}-3+\frac{1}{2}+$$

$$+\frac{25}{2}-15-\frac{9}{2}+9=6+13-15=4$$

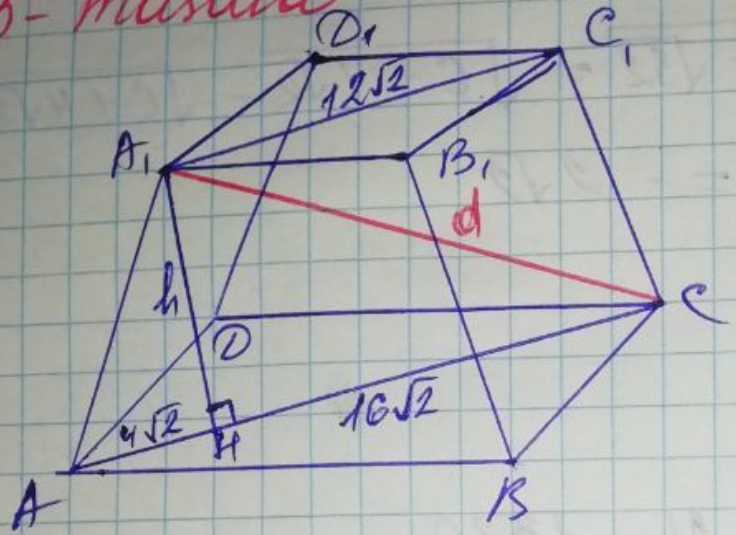
4-misol

$\vec{a}(-1;2;8)$, $\vec{b}(3;-2;15)$

$\vec{m}=\vec{b}-\vec{a}=(4;-4;7)$

$|\vec{m}| = \sqrt{16+16+49} = 9$

5- masala



$A_1B_1 = B_1C_1 = C_1D_1 = A_1D_1 = 12$

$AB = BC = CD = AD = 20$

$A_1C_1 = 12\sqrt{2}$

$AC = 20\sqrt{2}$

$h = 8$

$d = \sqrt{8^2 + (16\sqrt{2})^2} = \sqrt{64+512} = \sqrt{576} = 24$

23-bilet

1-misol

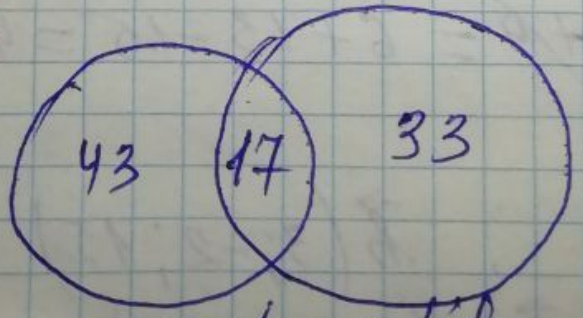
$$\frac{a^2+1}{a^2-1} + \frac{1}{a+1} : \left(\frac{1}{2-a} + \frac{2}{a(a-2)}\right) =$$

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

$$= \frac{a^2+1}{a^2-1} + \frac{1}{a+1} \cdot (-a) = \frac{a^2+1}{a^2-1} - \frac{a^2+a}{a^2-1} =$$

$$= \frac{1-a}{(a+1)(a-1)} = -\frac{1}{a+1}$$

2-misol.



$43+33+17 = 93$

$100-93 = 7$

7tasi fizikani ham, matematikani ham bilmaydi.

3- misol.

$\sqrt{3}\sin x \cdot \cos x = \sin^2 x$

$2\cdot\sqrt{3}\sin x \cdot \left(\frac{\sqrt{3}}{2}\cdot\cos x - \frac{1}{2}\sin x\right) = 0$.

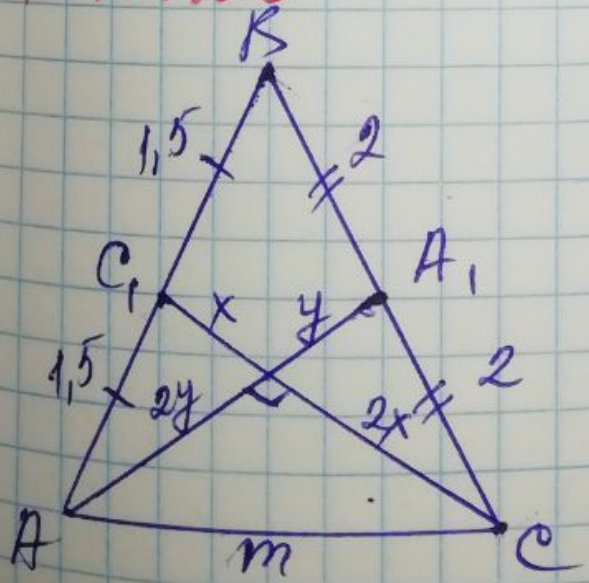
$$\begin{cases} \sin x = 0 \\ \frac{\sqrt{3}}{2}\cos x - \frac{1}{2}\sin x = 0 \end{cases}$$

$$\begin{cases} x = \pi k \\ \sin\left(\frac{\pi}{3} - x\right) = 0 \end{cases}$$

$x = \pi k$

$x = \frac{\pi}{3} - \pi k$

4- misol



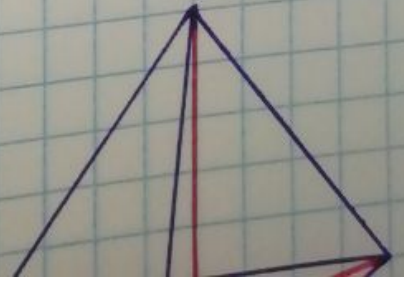
$$\begin{cases} x^2 + 4y^2 = 2{,}25 \\ y^2 + 4x^2 = 4 \end{cases}$$

$5(x^2+y^2) = 6{,}25$

$x^2+y^2 = 1{,}25$

$m = \sqrt{4(x^2+y^2)} = \sqrt{5}$.

5- masala



24-bilet

1-misol

$$x - \frac{x}{2} = 5$$

$$x^3 - \frac{8}{x^3} = \left(x - \frac{2}{x}\right) \cdot \left(x^2 + 2 + \frac{4}{x^2}\right) = \left(x - \frac{2}{x}\right) \cdot$$
$$\cdot \left(\left(x - \frac{2}{x}\right)^2 + 4\right) = 5 \cdot (25 + 4) = 29 \cdot 5 = 145$$

2-misol

$$A = N \cdot t$$
$$t = \frac{A}{N}$$
$$t_1 = \frac{A}{1{,}2N}$$
$$\frac{t_1}{t} = \frac{1}{1{,}2} = 0{,}08(3)$$

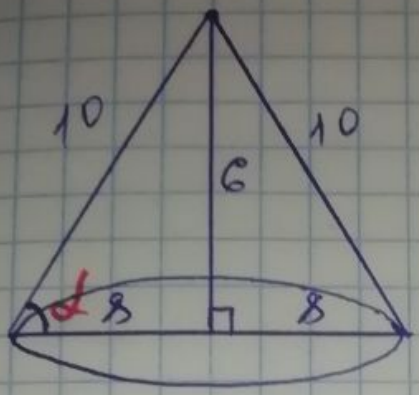
3-misol

$$\int_0^1 \frac{x\,dx}{1+x^2} = \frac{1}{2}\int_0^1 \frac{d(x^2+1)}{x^2+1} = \frac{1}{2}\left(\ln|x^2+1|\right)\Big|_0^1 =$$
$$= \frac{1}{2}(\ln 2 - \ln 1) = \frac{1}{2}\ln 2$$

4-masala

$$r = \frac{2a - 10}{2} = 1$$
$$a = 6$$
$$S_{ABC} = \frac{6 \cdot 6}{2} = 18$$

5-masala



$$R_{sh} = \frac{\sin\alpha}{1+\cos\alpha} \cdot R_{as} =$$

$$= \frac{0,6}{1+0,8} \cdot 8 = \frac{8}{3}$$

$$S_{sh} = 4\pi R_{sh}^2 = 4\pi \cdot \frac{64}{9} =$$

$$= \frac{256}{9}\pi$$

25-bilet

1-misol

$$x^2 - 5x + 2 = 0.$$

$$x^2 + \frac{4}{x^2} = ? \Rightarrow$$

$$\left(x^2 - 5x + 2\right) : x = x + \frac{2}{x} - 5 = 0.$$

$$x + \frac{2}{x} = 5$$

$$\Rightarrow \left(x + \frac{2}{x}\right)^2 - 2 = 25 - 2 = 23$$

2-misol

$$\log_{0,3}(2x+5) \geq \log_{0,3}(x+1)$$

$$\begin{cases} 2x+5 \leq x+1 \\ 2x+5 > 0 \\ x+1 > 0 \end{cases}$$

$$x \leq -4$$

$$x > -1$$