Часть 1

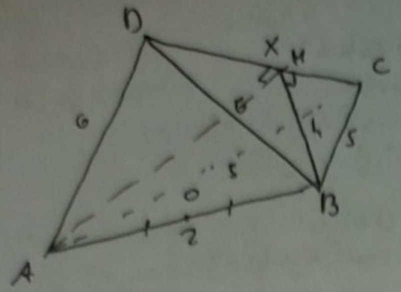
Олимпиада: **Математика, 11 класс (1 часть)**

Шифр: **21103105**

ID профиля: **155255**

Вариант 17

№2 Чистовик Математика 11 кл



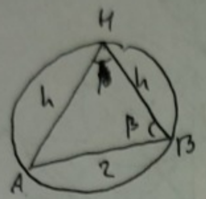
C, D ∈ бок. пов-ти и || оси => C, D ∈ одной образ. цилиндра =>

=> ~~проекция~~ (DC) ⊥ плоск. основаниям

- проведем высоты AH_1 и BH_2 в $\triangle ADC$ и $\triangle BDC$ соотв.

A и B симметр. отн. (DOC) => $H_1 = H_2 = H$

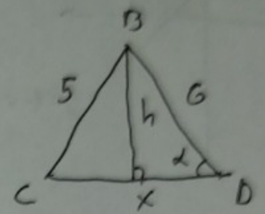
(ABH) || плоск. основаниям => окружность описанного $\triangle ABH$ равна основанию



$$2R = \frac{h}{\sin\beta}$$

$$\cos\beta = \frac{2^2 + h^2 - h^2}{2 \cdot 2 \cdot h} = \frac{1}{h}$$

$$\sin\beta = \sqrt{1 - \frac{1}{h^2}}$$



$$\cos\alpha = \frac{6^2 + x^2 - 5^2}{2 \cdot 6x} = \frac{x^2+11}{12x}$$

$$h = 6\sin\alpha = 6\sqrt{1 - \left(\frac{x^2+11}{12x}\right)^2}$$

$$2R = \frac{h}{\sqrt{1 - \frac{1}{h^2}}} = \frac{h^2}{\sqrt{h^2 - 1}} =$$

$$= \frac{36\left(1 - \left(\frac{x^2+11}{12x}\right)^2\right)}{\sqrt{36 - \left(\frac{x^2+11}{12x}\right)^2 - 1}} \to \min$$

$$h^2 = f(x)$$

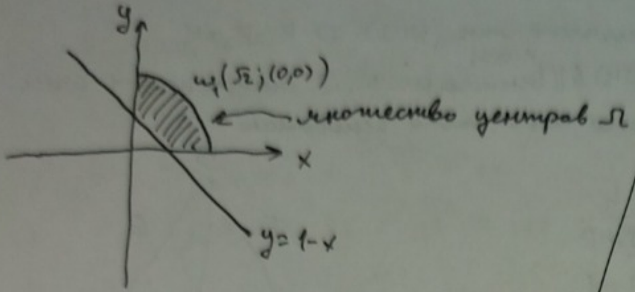
$$\begin{cases} \frac{dR}{dx} = \left(\frac{f}{\sqrt{f-1}}\right)' = \frac{f' \cdot \sqrt{f-1} - \frac{1}{2\sqrt{f-1}} \cdot f' \cdot f}{f-1} = 0 \\ \frac{d^2R}{dx^2} > 0 \end{cases}$$

Лист 2

№3 Чистовик Математика 11 кл

1) $2a+2b\geq 2$

$$\begin{cases} a+b\geq 1 \\ (x-a)^2+(y-b)^2\leq 2 - \text{круг } \Omega\ (\sqrt{2};(a,b)) \\ a^2+b^2\leq 2 - \text{круг } \omega_1 \end{cases}$$

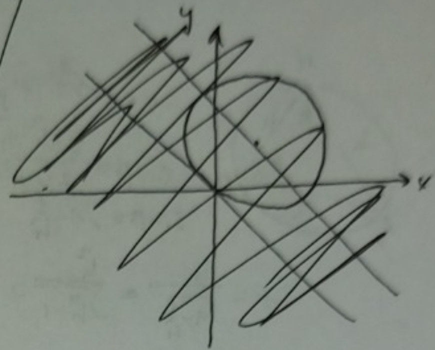


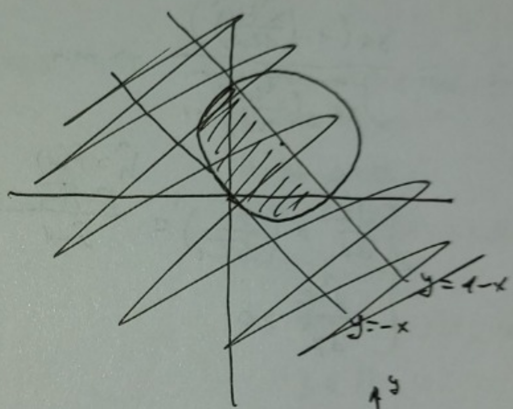
2) $2a+2b\leq 2$

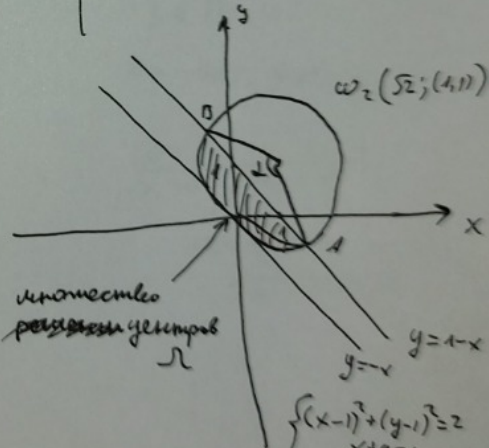
$$\begin{cases} a+b\leq 1 \\ (x-a)^2+(y-b)^2\leq 2 \end{cases}$$

$0\leq a^2+b^2\leq 2a+2b$

$$\begin{cases} a+b\leq 1 \\ (x-a)^2+(y-b)^2\leq 2 \\ (a-1)^2+(b-1)^2\leq 2 - \text{круг } \omega_2 \end{cases}$$







$$\begin{cases} (x-1)^2+(y-1)^2=2 \\ x+y=1 \end{cases}$$

$(x-1)^2+x^2=2$

$2x^2-2x-1=0$

$x=\frac{1}{2}\pm\frac{\sqrt{3}}{2}$

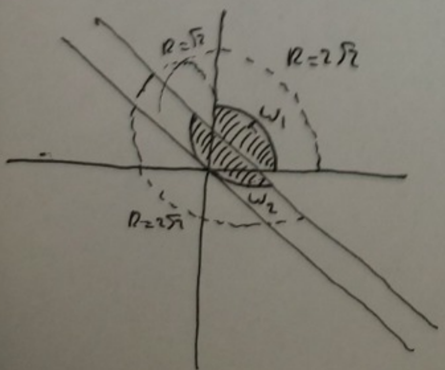
$y=\frac{1}{2}\mp\frac{\sqrt{3}}{2}$

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

$\cos\alpha=\frac{2+2-6}{2\cdot 2}=-\frac{1}{2}$

$\alpha=\frac{2\pi}{3}$

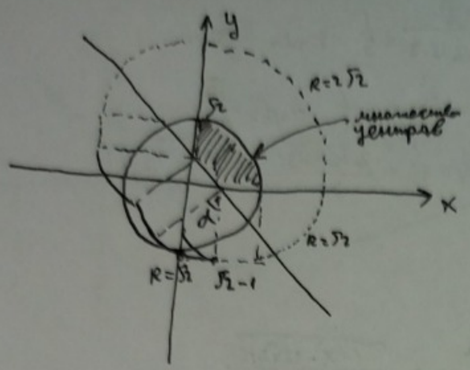
В итоге, множество центров Ω выглядит так:



черновик

$2a+2b \geqslant 2$

$$\begin{cases} a+b \geqslant 1 \\ (x-a)^2+(y-b)^2 \leq 2 \\ a^2+b^2 \leq 2 \end{cases}$$



$\alpha = \frac{\pi}{4}$

$S = \frac{1}{2}R^2\alpha$ - ~~сектор~~

$S = \cancel{\frac{1}{2}(2\sqrt{2})^2\cdot\frac{\pi}{2}} + 2\cdot\cancel{\frac{1}{2}(\sqrt{2})^2\cdot\frac{\pi}{2}} + \cancel{2\cdot(\sqrt{2}-1)\sqrt{2}} + \cancel{2\cdot\frac{1}{2}\cdot(\sqrt{2})^2\cdot\frac{\pi}{4}} +$

$+ \cancel{8\sqrt{2}-\sqrt{2}} =$

$= 6-2\cancel{\sqrt{2}} \cancel{+\frac{1}{2}\pi}$

$8+1+\frac{1}{2}$

$2 \geqslant 2a+2b$

$$\begin{cases} a+b \leq 1 \\ (x-a)^2+(y-b)^2 \leq 2 \\ 0 \leq a^2+b^2 \leq 2a+2b \end{cases}$$

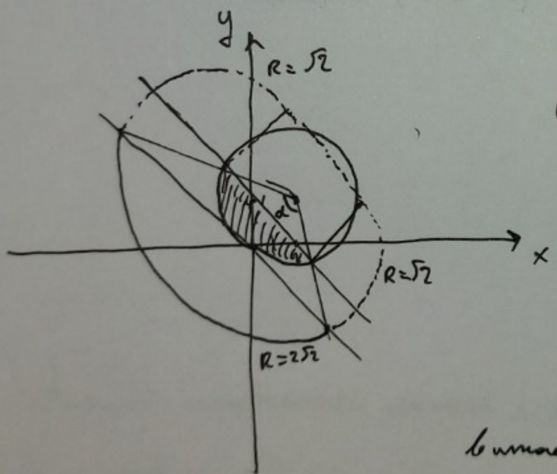
~~a+b≥0~~

$0 \leq a+b \leq 1$

$a^2+b^2 \leq 2a+2b$

$(a-1)^2+(b-1)^2 \leq 2$

$S = \frac{1}{2}R^2\alpha - \frac{1}{2}R^2\sin\alpha$



$(x-1)^2+(y-1)^2 = 2$

$x+y=1$

$x=1-y$

$(x-1)^2+x^2=2$

$2x^2-2x-1=0$

$D = 4+4\cdot2\cdot1 = 12$

$x = \frac{2\pm2\sqrt{3}}{4} = \frac{1}{2}\pm\frac{\sqrt{3}}{2}$

~~$x=\frac{2\pm2\sqrt{7}}{4}=\frac{1}{2}\pm\frac{\sqrt{7}}{2}$ $y=\frac{1}{2}\mp\frac{\sqrt{7}}{2}$~~

~~$a=\sqrt{(\sqrt{7})^2+(\sqrt{7})^2}=\sqrt{14}$~~

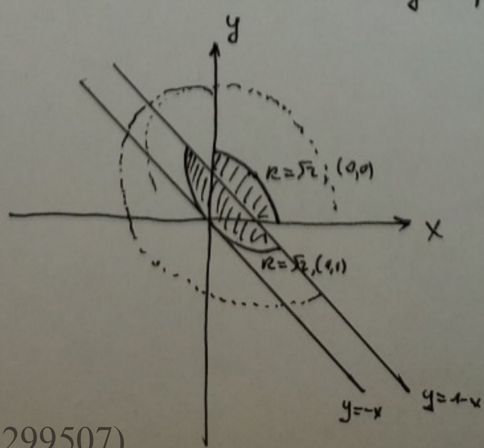
$a = \sqrt{(\sqrt{3})^2+(\sqrt{3})^2} = \sqrt{6}$

~~$\cos\alpha = \frac{2+2-14}{2\sqrt{2}\sqrt{2}} = -\frac{5}{2}$~~

$\cos\alpha = \frac{2+2-6}{2\cdot\sqrt{2}\cdot\sqrt{2}} = -\frac{1}{2}$

$\alpha = \frac{2\pi}{3}$

в итоге множество центров:



$S = \frac{1}{2}(2\sqrt{2})^2\cdot\frac{\pi}{2} + \frac{1}{2}(2\sqrt{2})^2\cdot(\alpha-\sin\alpha) +$

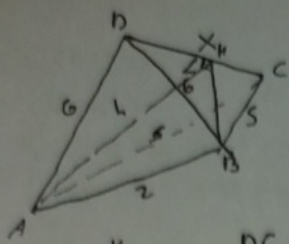
$+$

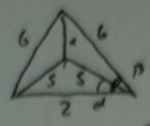
$\rho\left((0,\sqrt{2}),\left(\frac{1}{2}-\frac{\sqrt{3}}{2};\frac{1}{2}+\frac{\sqrt{3}}{2}\right)\right)$

$\rho = \frac{1}{4}-\frac{3}{4}+\frac{\sqrt{3}}{2}+\left(\sqrt{2}-\frac{1}{2}-\frac{\sqrt{3}}{2}\right)^2$

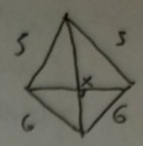
$= \frac{1}{4}-\frac{3}{4}+\frac{\sqrt{3}}{2}+2+\frac{1}{4}+\frac{3}{4}-\sqrt{6}-\sqrt{2}+\frac{\sqrt{3}}{2}$

черновик





X_{max}, X_{min}

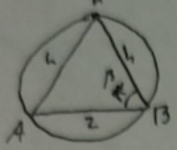


$$x^2 = 5^2 + 6^2 - 2\cdot 5\cdot 6\cdot\cos(\beta-\alpha)$$

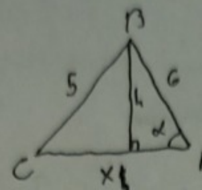
$$\cos\alpha = \frac{2^2}{2\cdot 5\cdot 2} = \frac{1}{5} \quad \sin\alpha = \frac{2\sqrt{6}}{5}$$

$$\cos\beta = \frac{2^2}{2\cdot 6\cdot 2} = \frac{1}{6} \quad \sin\beta = \frac{\sqrt{35}}{6}$$

$$\cos(\beta-\alpha) = \frac{1}{30} + \frac{2\sqrt{6}\cdot\sqrt{35}}{30} = \frac{2\sqrt{210}+1}{30}$$



DC $\in$ обрaз.



$$\cos\beta = \frac{2^2}{2\cdot 2\cdot h} = \frac{1}{h}$$

$$\sin\beta = \sqrt{1-\frac{1}{h^2}}$$

$$2R = \frac{h}{\sin\beta} = \frac{h}{\sqrt{1-\frac{1}{h^2}}} = \frac{h^2}{\sqrt{h^2-1}} =$$

$$\cos\alpha = \frac{6^2+x^2-5^2}{2\cdot 6x} = \frac{x^2+11}{12x}$$

$$h = 6\sin\alpha = 6\cdot\sqrt{1-\left(\frac{x^2+11}{12x}\right)^2} = 6\sqrt{\frac{1-x^4-22x^2-121}{(12x)^2}}$$

$$h^2 = 36\cdot\frac{-x^4-22x^2-120}{144x^2}$$

$$= \frac{36\cdot\frac{-x^4-22x^2-120}{144x^2}}{\sqrt{\frac{x^4+22x^2+120}{144x^2}-1}}$$

$$h^2 = f$$

$$f' = \frac{(-4x^3-44x)\cdot 144x^2 - 288x(-x^4-22x^2-120)}{144^2x^4}$$

$$\cancel{R = \frac{f}{2\sqrt{f-1}}}$$

$$\cancel{R' = \frac{f'\cdot 2\sqrt{1-f} - \frac{1}{\sqrt{1-f}}\cdot f'\cdot f}{4-4f}}$$

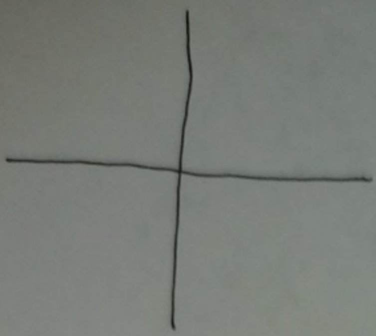
$$R = \frac{f}{2\sqrt{f-1}}$$

$$R' = \frac{f'\cdot 2\sqrt{f-1} - \frac{f'}{\sqrt{f-1}}\cdot f}{4f-4} = 0$$

$$f'(2f-2-f) = f'(f-2) = 0$$

черновик

$(0;1)$ $R=\sqrt2$



$\sqrt{\frac{a^2+b^2}{2}} \geq \frac{a+b}{2}$

$\frac{a^2+b^2}{2} \geq \frac{a^2+2ab+b^2}{4}$

$\frac{a^2-2ab+b^2}{4} \geq 0$

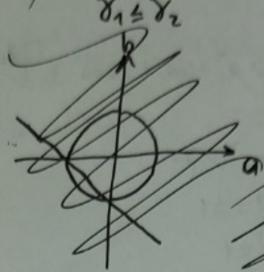
$\frac{(a-b)^2}{4} \geq 0$

1) $2a+2b \geq 2$

$a+b \geq 1$

$\gamma_1 \le \gamma_2$

$\gamma_1, \gamma_2 \geq 0$



$2a+2b \geq 2$

$a+b \geq 1$

$a^2+b^2 \le 2a+2b$

$(a+b)^2 \le 2a+2b+2ab =$

$x^2+y^2 \le 2x+2y$

$x^2-2x+y^2-2y \le 0$

$D = 4-4y^2+8y = -4(y-1)^2+8 \geq 0$

$-4(y-1)^2+2 \geq 0$

$(y-1)^2 \le 2$

$-\sqrt2 \le y-1 \le \sqrt2$

$-\sqrt2+1 \le y \le \sqrt2+1$

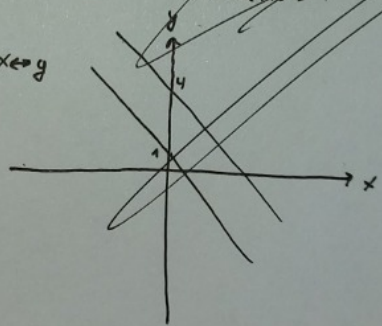
$-\sqrt2+1 \le x \le \sqrt2+1$ $x \leftrightarrow y$

$(x-1)^2+(y-1)^2 \le 2$

$$\begin{cases} x^2-2ax+a^2+y^2-2by+b^2 \le 2 \\ a+b \geq 1 \\ a^2+b^2 \le 2a+2b \end{cases}$$

$\frac{(a+b)^2}{4} \le \frac{a^2+b^2}{2} \le a+b$

$1 \le a+b \le 4$



21103105 (U155255 M1299507)

a_1 $\qquad a_n \in \mathbb{Z}$ $\qquad$ черновик

$a_2 = a_1 + d$

$a_n = a_1 + (n-1)d$

$$S_{10} = \frac{2a_1+9d}{2} \cdot$$

$$\begin{cases} (a_1+5d)(a_1+11d) > \frac{2a_1+9d}{2} \cdot 9, 1 \\ (a_1+6d)(a_1+10d) < \frac{2a_1+9d}{2} \cdot 9\ 17 \end{cases}$$

$$\begin{cases} a_1^2 + 16a_1d + 55d^2 > \frac{2a_1+9d}{2} \cdot 10 + 1 \\ a_1^2 + 16a_1d + 60d^2 < \frac{2a_1+9d}{2} \cdot 10 + 17 \end{cases}$$

$$\cancel{a_1^2} + \cancel{16a_1d} + 55d^2 + \cancel{(2a_1+9d) \cdot 5} + 17 > \cancel{a_1^2} + \cancel{16a_1d} + 60d^2 + \cancel{(2a_1+9d) \cdot 5} + 1$$

$5d^2 < 16$

$d = \pm 1$

$d = 1$

$a_1^2 + 16a_1 + 55 > 10a_1 + 45 + 1$

$a_1^2 + 6a_1 + 9 > 0$

$(a_1+3)^2 > 0$

$a_1 \neq -3$

$a_1^2 + 16a_1 + 60 < 10a_1 + 45 + 17$

$a_1^2 + 6a_1 - 2 < 0$

$D = 36 + 8 = 44$

$a_1 = \frac{-6 + 2\sqrt{11}}{2} = -3 + \sqrt{11}$

$a_2 = -3 - \sqrt{11}$

$a \in (-3-\sqrt{11}; -3+\sqrt{11})$

$3 < \sqrt{11} < 4$

$a = -6; -5; -4; -3; -2; -1; 0$

$a \qquad a$

$-7 \quad -6 \qquad -3 \qquad 0 \quad 1$

$\underline{\underline{a_1 = -6; -5; -4; -2; -1; 0}}$

21103105 (U155255 M1299507)

№1 Чистовик Математика 11м

арифм прогрессия $a_{n+1} = a_n + d$, $a_n = a_1 + (n-1)d$

$S_{10} = \frac{a_1 + a_1 + 9d}{2} \cdot 10 = (2a_1 + 9d) \cdot 5$

$\begin{cases} (a_1+5d)(a_1+11d) > (10a_1+45d)+1 \\ (a_1+6d)(a_1+10d) < (10a_1+45d)+17 \end{cases}$

$\begin{cases} a_1^2 + 16a_1d + 55d^2 > 10a_1 + 45d + 1 \\ a_1^2 + 16a_1d + 60d^2 < 10a_1 + 45d + 17 \end{cases}$ −

$-5d^2 > -16$

$d^2 < \frac{16}{5}$ $\qquad 3 < \frac{16}{5} < 4$

$a_n \in \mathbb{Z} \Rightarrow d \in \mathbb{Z} \Rightarrow d = \pm 1; 0$

посл возрастает $\Rightarrow d = 1$

$a_1^2 + 16a_1 + 55 > 10a_1 + 46$

$a_1^2 + 6a_1 + 9 > 0$

$(a_1+3)^2 > 0$

$a_1 \neq -3$

$a_1^2 + 16a_1 + 60 < 10a_1 + 45 + 17$

$a_1^2 + 6a_1 - 2 < 0$

$D = 36 + 8 = 44$

$a_1 = \frac{-6 \pm 2\sqrt{11}}{2} = -3 \pm \sqrt{11}$

$a \in (-3-\sqrt{11}; -3+\sqrt{11})$

$3 < \sqrt{11} < 4$

$a_1 = -6; -5; -4; -3; -2; -1; 0$

ответ: $a_1 = -6; -5; -4; -2; -1; 0$

Лист 1

Часть 2

Олимпиада: **Математика, 11 класс (2 часть)**

Шифр: **21103105**

ID профиля: **155255**

Вариант 17

Чистовик

Математика 11м

№5

$a = 5x-1,\ b = 4x+1,\ c = \frac{x}{2}+2$

$a, b, c > 0$

$a, b, c \neq 1$

данные числа $x = \log_{\sqrt{a}} b = 2\log_a b$

$y = \log_b c^2 = 2\log_b c$

$z = \log_c a$

заметим, что $xyz = 4$

1) $\begin{cases} xyz = 4 \\ x = y,\ z = x-1 \end{cases}$

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

$x^3 - x^2 - 4 = 0$

$x = 2$

$(x-2)(x^2+x+2) = 0$

$D < 0$

$\begin{cases} x = 2 \\ y = 2 \\ z = 1 \end{cases} \Rightarrow \begin{cases} \log_a b = 1 \\ \log_b c = 1 \\ \log_c a = 1 \end{cases} \Rightarrow$ $a = b = c$, чего быть не может

$5x-1 = 4x+1 = \frac{x}{2}+2$

$\varnothing$

2) $x = z,\ y = x-1$

аналогично $\begin{cases} x = 2 \\ z = 2 \\ y = 1 \end{cases}$ $\begin{cases} \log_a b = 1 \\ \log_c a = 2 \\ \log_b c = \frac{1}{2} \end{cases}$ $\begin{cases} 5x-1 = 4x+1 \\ 5x-1 = \left(\frac{x}{2}+2\right)^2 \\ \left(\frac{x}{2}+2\right)^2 = 4x+1 \end{cases}$ $x = 2$

$10-1 = \left(\frac{2}{2}+2\right)^2$ ~~ок~~

$\underline{\underline{x = 2}}$

3) $y = z,\ x = y-1$

аналогично $\begin{cases} y = 2 \\ z = 2 \\ x = 1 \end{cases}$ $\begin{cases} \log_b c = 1 \\ \log_c a = 2 \\ \log_a b = \frac{1}{2} \end{cases}$ $\begin{cases} 4x+1 = \frac{x}{2}+2 \\ 5x-1 = \left(\frac{x}{2}+2\right)^2 \\ (4x+1)^2 = 5x-1 \end{cases}$ $x = \frac{2}{7}$

$\frac{3}{7} \neq \left(\frac{15}{7}\right)^2$

$\varnothing$

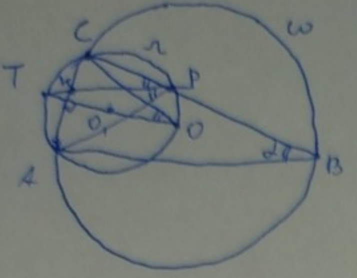
Ответ: $x = 2$

Лист 1

чистовик

математика, 11 кл

№6



$\triangle ABC$ - остроуг. $\Rightarrow O \in \triangle ABC$

$CT \perp OC$, $AT \perp OC$ (кас)

в $ATCO$ $\angle COA = 360° - 90° - 90° - \angle CTA = 180° - \angle CTA \Rightarrow T \in \Omega$

T диаметр противоположн. O

у $\triangle CKP$ и $\triangle APK$ общая высота $\Rightarrow \frac{AK}{CK} = \frac{S_{APK}}{S_{CKP}} = \frac{3}{2}$

$\angle CPT = \angle COT$ (впис)

$\angle COT = \frac{1}{2}\angle COA = \angle ABC$ (впис.) $\Rightarrow TP \parallel AB \Rightarrow \triangle ABC \sim \triangle KPC$, $k = \frac{2+3}{2} = \frac{5}{2}$

$S_{ABC} = k^2 S_{KPC} = \frac{25}{4} \cdot 4 = 25$

$tg\,\alpha = \frac{7}{5} \Rightarrow \cos\alpha = \frac{5}{\sqrt{74}}$, $\sin\alpha = \frac{7}{\sqrt{74}}$, т.к. α - острый

$OT \perp AC$, т.к. $A \leftrightarrow C$ отн (OO_1), а $O_1 \in [OT] \Rightarrow OT$ - бисс $\angle AOC$

$\cap AT = \cap TC \Rightarrow \angle CPT = \angle APT$ (впис) $\Rightarrow \frac{PC}{AP} = \frac{2}{3}$

$S_{APC} = 10 = \frac{1}{2} AP \cdot PC \cdot \sin 2\alpha = \frac{1}{2} \cdot AP \cdot \frac{2}{3} AP \cdot 2 \cdot \frac{5 \cdot 7}{74} = \frac{5 \cdot 7}{3 \cdot 37} AP^2$

$AP^2 = \frac{6 \cdot 37}{7}$

$PC^2 = \frac{4}{9} AP^2 = \frac{24 \cdot 37}{9 \cdot 7}$

$\cos 2\alpha = \cos^2\alpha - \sin^2\alpha = -\frac{24}{74}$

Th cos $AC^2 = AP^2 + PC^2 + -2 AP \cdot PC \cdot \cos 2\alpha =$

$= \frac{3 \cdot 74}{7} + \frac{4 \cdot 74}{3 \cdot 7} + 2 \cdot \sqrt{\frac{3 \cdot 74 \cdot 4 \cdot 74}{3 \cdot 7 \cdot 7}} \cdot \frac{24}{74} =$

$= \frac{13 \cdot 74}{21} + \frac{2 \cdot 2 \cdot 24}{7} = \frac{13 \cdot 74 + 288}{21} = AC^2 = \frac{25 \cdot 50}{21}$

$$\begin{array}{r} 74 \\ \times\ 13 \\ \hline 222 \\ 74\ \ \\ \hline 962 \end{array}$$

$962 + 288 = 1162 + 88 = 1250$

$AC = 5\sqrt{\frac{50}{21}}$

лист 2

Чистовик Математика 11кл

№4

a, b и c содержат разное число троек и двоек, но хотя бы по 1

НОД · НОК = $a \cdot b \cdot c = 2^{16} \cdot 3^{17}$

пусть a содержит n двоек, тогда b и c могут содержать 1, 2, 3... 15−n

$1 \le n \le 14$

всего вариантов расстановки двоек $\sum_{1}^{14}$

аналогично, если a содержит m троек то b и c могут содержать 1, 2, 3... 16−m

$1 \le m \le 15$

лист 3

Черновик

~~8~~ НОК $= 2^{15} \cdot 3^{16}$

a не содерж. 2

a не содерж. 3

Черновик

$AP^2 = \frac{3}{4}PC^2 = \frac{3 \cdot 74}{3 \cdot 7}$

$AC^2 = AP^2 + PC^2 - 2AP \cdot PC \cdot \cos 2\alpha = \frac{3 \cdot 74}{7} + \frac{4 \cdot 74}{3 \cdot 7} + 2 \cdot \sqrt{\frac{3 \cdot 74}{7} \cdot \frac{4 \cdot 74}{7}} \cdot \frac{24}{74} =$

$\cos 2\alpha = \cos^2\alpha - \sin^2\alpha = \frac{25}{74} - \frac{49}{74} = \frac{24}{74}$

$= \frac{9 \cdot 74 + 4 \cdot 74 + 2 \cdot 2 \cdot \sqrt{3} \cdot 24 \cdot 3}{21} =$

$= \frac{13 \cdot 74 + 288\sqrt{3}}{21}$

$AC = \sqrt{AC^2}$

$2\log_a b = 2\log_b c$

$\log_c a = 2\log_a b - 1$

$\log_a b = \log_b c$

$5x-1$

$4x+1$

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

$5x-1-4x-1 = -x-2$

$x+4$

$2\log_a b = \log_c a$

$2\log_b c = \log_c a - 1$

$\frac{2\ln b}{\ln a} = \frac{\ln a}{\ln c}$

$\frac{2\ln c}{\ln b} = \frac{\ln a - \ln c}{\ln c}$

$\log_{5a} b, \log_b c^2, \log_c a$

$2\log_a b, 2\log_b c, \log_c a$

$2\log_a b \cdot 2\log_b c = \frac{4}{\log_c a}$

$\begin{cases} xyz = 4 \\ x = y,\ z = x-1 \end{cases}$

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

$x^3 - x^2 - 4 = 0$

$x = 2$

$(x-2)(x^2+x+2) = 0$

$D < 0$

$\begin{cases} x = 2 \\ y = 2 \\ z = 1 \end{cases}$

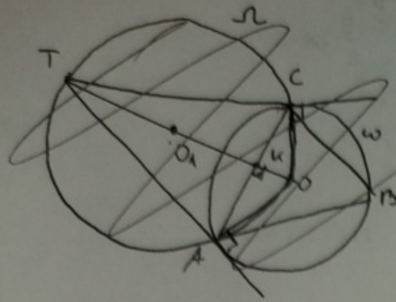
$2\log_{(5x-1)} 4x+1 = 2$

$2\log_{(4x+1)}(\frac{x}{2}+2) = 2$

$\log_{\frac{x}{2}+2}(5x-1) = 1$

$5x-1 = 4x+1 = \frac{x}{2}+2 \quad \varnothing$

Черновик



$P=C$

CT_A – касат. $\Rightarrow CT \perp OC$

$AT \perp AO$

в $AOCT$ $\angle COA = 360° - 90° - 90° - \angle CTA \Rightarrow$ ~~$T \in \Omega$~~

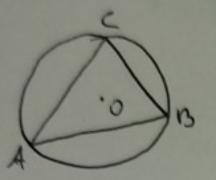
~~T диаметр. противополож. точке O =>~~

$\Rightarrow AC \perp TO$

~~$S_{APK}=6$~~

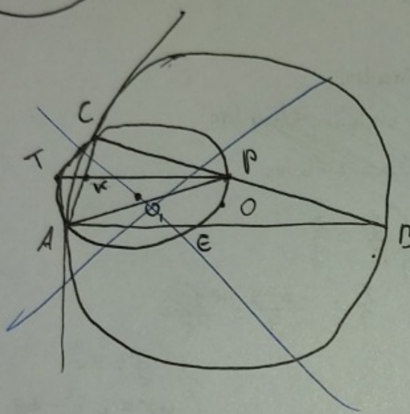
~~$S_{CPK}=4$~~

ABC - остроуг. $\Rightarrow O \in \triangle ABC$



T диаметр противоположн. O

$OT \perp AC$

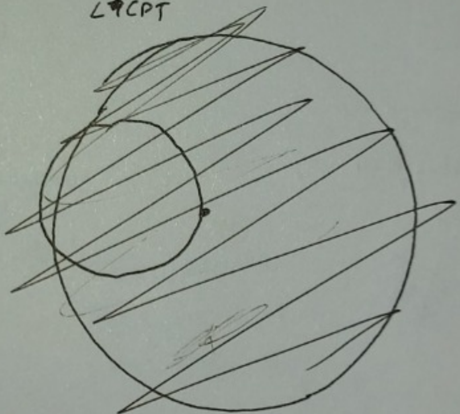


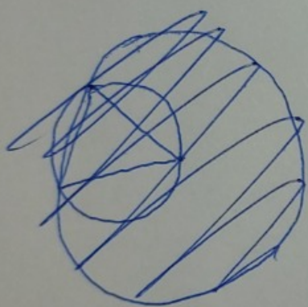
$S_{APK}=6$

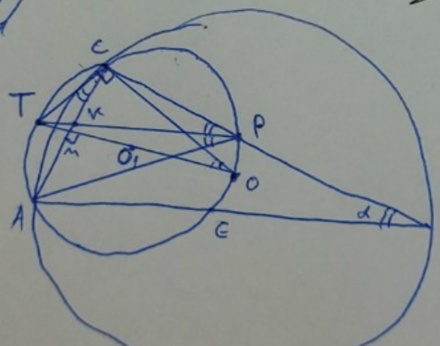
$S_{CPK}=4$

$\frac{CK}{AK}=\frac{3}{2}$ $h = const$

$\angle CPT$







~~$\angle APB$~~

$\angle CPT = \angle COT$ (впис.)

$OT \perp AC \Rightarrow \angle COT = \frac{1}{2}\angle AOC = \angle ABC$ (впис.)

$\angle ABC = \angle CPT \Rightarrow AB \parallel PT \Rightarrow$

$\Rightarrow \triangle ABC \sim \triangle KPC \Rightarrow$

$\Rightarrow \frac{S_{ABC}}{S_{KPC}} = k^2 = \left(\frac{5}{2}\right)^2 = \frac{25}{4}$

$S_{ABC} = \frac{25}{4} \cdot 4 = \underline{\underline{25}}$

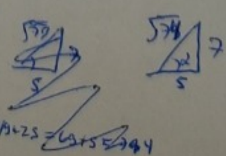
$tg\angle ABC = \frac{7}{5} = \frac{\frac{1}{2}AC}{OM} = \frac{CT}{OC} = \frac{TM}{\frac{1}{2}AC}$

$CK = 4x$

$AK = 6x$

$\cos ABC =$

~~$\frac{1}{4}AC^2 = TM \cdot OM$~~



$OT \perp AC \Rightarrow \cup AT = \cup TC$

$\angle APT = \angle CPT$ $S = \frac{1}{2}AP \cdot PC \cdot \sin\alpha$

$\frac{PC}{AP} = \frac{2}{3}$

$6+4 = \frac{1}{2}PC \cdot AP \cdot \sin 2\alpha = PC \cdot AP \cdot \sin\alpha\cos\alpha = PC \cdot AP \cdot \frac{35}{74} = 10$

$PC \cdot AP = \frac{740}{35} = \frac{148}{7} = PC \cdot \frac{3}{2}PC$ $PC^2 = \frac{2 \cdot 148}{3 \cdot 7}$

черновик

$5x-1=a$

$4x+1=b$

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

$a>0$ $a\neq1$ $b>0$ $b\neq1$ $c>0$ $c\neq1$

$\begin{cases} x>\frac{1}{5} \\ x\neq\frac{2}{5} \\ x>-\frac{1}{4} \\ x\neq0 \\ x>-4 \\ x\neq-2 \end{cases}$

1) $\begin{cases} \log_{\sqrt{a}} b = \log_b c^2 \\ \log_c a = \log_b c^2 - 1 \end{cases}$

$\begin{cases} \log_a b = \log_b c \\ \log_c a = \log_b \frac{c^2}{b} \end{cases}$ $\quad \log_a b = \log_b c$ $\quad \log_c a = \log_a \frac{b^2}{a}$

$\begin{cases} \frac{\ln b}{\ln a} = \frac{\ln c}{\ln b} \\ \frac{\ln a}{\ln c} = \frac{2\ln c - \ln b}{\ln b} \end{cases}$ $\quad \begin{cases} \frac{\ln b}{\ln a} = \frac{\ln c}{\ln b} \\ \frac{\ln a}{\ln c} = \frac{2\ln b - \ln a}{\ln a} \end{cases}$

$\begin{cases} \ln^2 b = \ln a \cdot \ln c \\ \ln a \cdot \ln b = 2\ln^2 c - \ln b \ln c \end{cases}$

$\ln^2 b + \ln^2 a = 2\ln b \ln c$

$\ln a = 2\ln^2 c - \ldots$

$\begin{cases} \frac{y}{x} = \frac{z}{y} \\ \frac{x}{z} = \frac{2z-y}{y} \end{cases}$

$\begin{cases} y^2 = zx \\ yx = 2z^2 - zy \end{cases}$

$2\log_a b = 2\log_b c$

$\log_c a = 2\log_b c - 1$