Часть 1

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

Шифр: **21101485**

ID профиля: **236254**

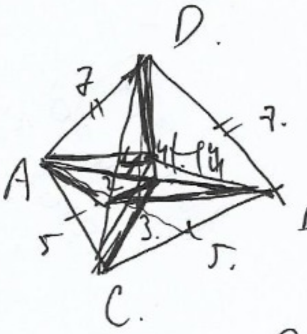
Вариант 22

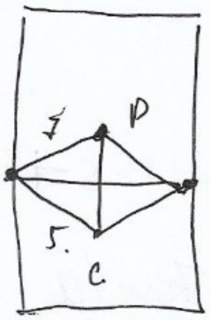
черновик.

№2.

$49-4=45.$

$25-4=21$





$49-4$

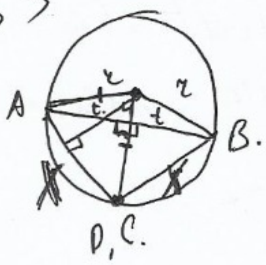
$\sqrt{45}.$

$25-4=\sqrt{21}$

$21-4=\sqrt{17}$

$45-4=\sqrt{41}$

$49-16=33$



$25-16=9.$

$25-16=3$

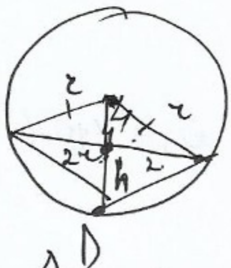
$r^2=x^2+h^2$

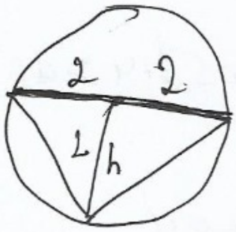
$r^2=t^2+y_1^2$

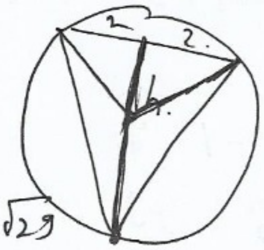
$x^2=t^2+(r-y_1)^2$

$r^2=t^2+y_1^2$

$x^2=t^2+r^2-2ry_1+y_1^2$



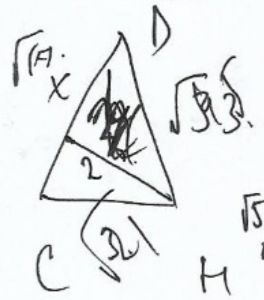




$\sqrt{29}+\sqrt{5}.$

$r^2=(h-r)^2+4.$

$r^2=h^2+r^2-2hr.$



M 3

$33-4=\sqrt{29}$

$16=r^2+r^2-2\cdot r^2\cdot\cos\alpha$

$4=\sqrt{33}\quad 9-4=$

$8=r^2-r^2\cos\alpha$

$r^2(1-\cos\alpha)=8$

$r^2=(r-h)^2+4.$

$r^2=r^2-2rh+h^2+4$

$33-16=\sqrt{17}$

$13.$

$23-6=17$

$r^2=\dfrac{8}{1-\cos\alpha}$

$\cos\alpha=-1$

$2rh=h^2+4$

$r=\dfrac{h^2+4}{2h}$

$r^2=4.$

$h=2.$

$r=\dfrac{4+4}{4}=2.$

$h^2=33-x^2$

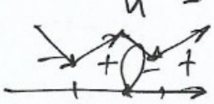
$h^2=$

$h^2=33-y^2$

$r=2$

$r'=\dfrac{2h\cdot 2h-2(h^2+4)}{4h^2}=$

$=\dfrac{4h^2-2h^2-8}{4h^2}$



$\dfrac{(h-2)(h+2)}{4h^2}=0$

$\dfrac{2h^2-8}{4h^2}=0$

черновик.

№1.

$$S=\frac{2a_1+d(n-1)}{2}n \qquad a_1+a_{15} \qquad 1\ 2\ 3 \qquad S=\frac{2+1\cdot 2}{2}\cdot 3=6.$$

$a_{16}a_7=(a_1+6d)(a_1+15d)>S-24$

$a_{11}\quad (a_1+10d)(a_1+11d)<S+4$

$$S=\frac{2a_1+d\cdot 14}{2}\cdot 15=(a_1+7d)15.$$

$15\cdot(-3+7)\cdot 4=60$

$(-3+6)(-3+15)>60-24$

$3\cdot 12$

$36>36$ неверно

$(-3+7)15=a_1^2+6da_1+15da_1+90d^2>(a_1+7d)\cdot 15-24$

$=\quad a_1^2+21da_1+90d^2>15a_1+105d-24$

$a_1^2+21da_1+110d^2<15a_1+105d+4$

$90+105+24$

$114-105=9$

$-6\cdot 15=-90.\ 15a_1+105d+4>a_1^2+21da_1+110d^2$

$-3+2,8$

$a_1^2+21da_1+90d^2+15a_1+105d+4>a_1^2+21da_1+110d^2+15a_1+105d-24$

$\frac{-2+14}{2}\cdot 15$

$15:-1+7.\qquad 20d^2<28$

$6.\ 90.\qquad d^2<\frac{14}{10}$

$3\cdot 24$

$\frac{1+4}{2}=2,5$

$-3-2,8$

$-5,8$

$(-1+6)(-1+15)\qquad$ т.к. $d>0\Rightarrow d=1.$

$5\cdot 14>90-24.\quad a_1^2+6a_1+15a_1+90>15a_1+105-24$

$70.>\qquad (1)\quad a_1^2+6a_1+9>0.\quad (a_1+3)^2>0.$

$-2+7.\qquad\qquad 114-105$

$5\cdot 15=75.\quad a_1^2+21a_1+110<15a_1+105+4.\qquad =9.$

$a_1^2+6a_1+1<0.\qquad -15+24.$

$4\cdot 13>75-24$

$D=36-4=32.=2^5.\qquad 4\cdot 2\qquad 16\cdot 2\qquad 5-4$

$9\cdot 10<90+4.$

$$a_{1,2}=\frac{-6\pm 4\sqrt{2}}{2}=-3\pm 2\sqrt{2}\qquad a_1\neq -3.$$

$a_1\in[-5;-3)\cup(-3;-1]$

$-3-2\sqrt{2}=-3-2,8=-5,8.$

$-3+2,8=-0,2.\quad 2\cdot 1,4.\quad 2\cdot 1,5=3$

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Ответ: $a_1\in[-5;-3)\cup(-3;-1]$

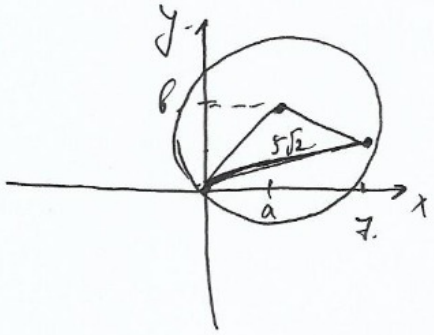
$-1<-0,2.\quad 0.$

Черновик.

№3.

$$\begin{cases} (x-a)^2+(y-b)^2 \le 50 \\ a^2+b^2 \le \min(14a+2b;50) \end{cases}$$

— окружность с радиусом $5\sqrt{2}$ и центром $(a;b)$.



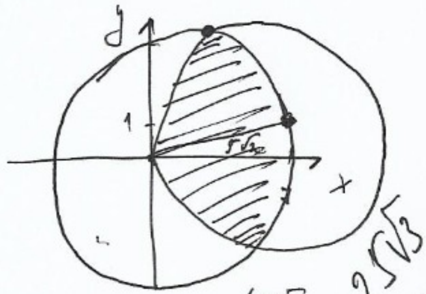
$a^2+b^2 \le 14a+2b$

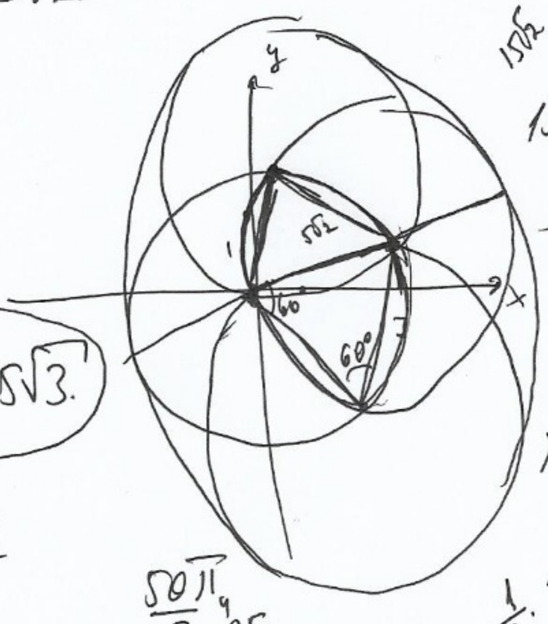
$(a-7)^2-49+(b-1)^2-1 \le 0.$

$(a-7)^2+(b-1)^2 \le 50.$

$$\begin{cases} \sqrt{(a-7)^2+(b-1)^2} \le 5\sqrt{2} \\ \sqrt{a^2+b^2} \le \sqrt{50} \le 5\sqrt{2} \\ (x-a)^2+(y-b)^2 \le (5\sqrt{2})^2 \end{cases}$$

$\sqrt{1^2+49^2} = \sqrt{50} = 5\sqrt{2}$





$\frac{90}{480} = \frac{\frac{100\pi}{3}}{x}$ $\frac{100\pi}{3} - 25\sqrt{3}$

$x = \boxed{300\pi - 225\sqrt{3}}$

15√2 15 3 950

$S = 4R$, πr^2

$(a-7)^2+(b-1)^2 = 5\sqrt{2}$

$a^2+b^2 = 5\sqrt{2}$

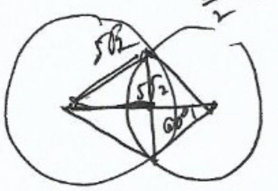
$(a-7)^2+(b-1)^2 = a^2+b^2$

$\cancel{a^2} - 14a + 49 + \cancel{b^2} - 2b + 1 = \cancel{a^2} + \cancel{b^2}$

$14a+2b = 50$

$\frac{50\pi}{3} \cdot \frac{25}{9}$ $\frac{1}{6}\cdot \pi r^2$ $\times \frac{25}{9}$

$\frac{5\sqrt{2}}{2} =$



$5\sqrt{2}$

$\frac{50\sqrt{3}}{2}\cdot 2$ $25\sqrt{3}\sqrt{2} = \frac{50-2b}{14}$

$\frac{5\sqrt{2}\cdot 5\sqrt{6}}{2} = 25\sqrt{3}$ $\sqrt{3}$

$5\sqrt{2}\cdot\pi$ $\frac{2\cdot 50\pi}{6\cdot 3}$

$\pi r^2 - 180°$ $50 - \frac{50}{4}$ 3 5

$\frac{\pi r^2}{3} - 60°$

$\frac{\sqrt{3}}{2}\cdot 50$ $\frac{\sqrt{3}}{2}\cdot 5\sqrt{2} = \frac{\sqrt{3}}{\sqrt{2}}5$ $5\sqrt{6}$ $\frac{4\cdot\pi r^2}{6}$ $\frac{2}{3}\pi r^2$

$\frac{2}{3}\pi \cdot 50$ 2

Чистовик   Вар 22. ч. 1

№1.

$S = \frac{2a_1+14d}{2} \cdot 15 = 15(a_1+7d)$

$a_7 a_{16} = (a_1+6d)(a_1+15d) > S-24$

$a_{11} \cdot a_{12} = (a_1+10d)(a_2+11d) < S+4.$

$+\ a_1^2+21da_1+90d^2 > 15a_1+105d-24.$

$15a_1+105d+4 > a_1^2+21da_1+110d^2$

$20d^2<28.$, т.к $d>0 \Rightarrow d=1.$

$a_1^2+6a_1+\cancel{15a_1}+90 > \cancel{15a_1}+105-24$

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

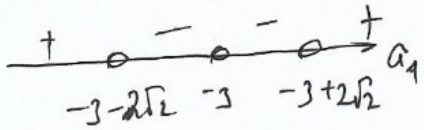
(1) $(a_1+3)^2>0$ $a_1 \neq -3$

$a_1^2+21a_1+110 < 15a_1+105+4.$

$a_1^2+6a_1+1 <0.$

$D = 36-4 = 32 = (4\sqrt{2})^2$

$a_{1,2} = \frac{-6 \pm 4\sqrt{2}}{2} = -3 \pm 2\sqrt{2}.$



$-5 > -3-2\sqrt{2}$ $(\approx -5{,}8)$

$-1 < -3+2\sqrt{2}$ $(\approx -0{,}2)$

$\Downarrow$

$a_1 = -5; -4; -2; -1$

Ответ: $-5; -4; -2; -1$

1

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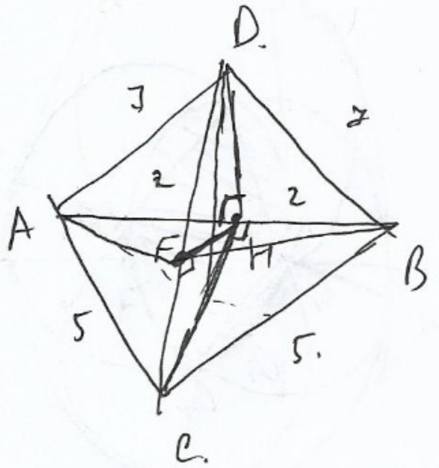
Чистовик Вар 22 ч. 1.

№2



т.к $AD=DB$, $AC=CB$, $\Rightarrow$ $AH=HB$

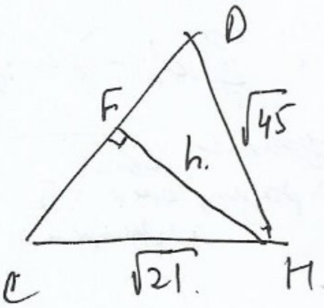
$DH\perp AB$

$CH\perp AB$

$DH=\sqrt{49-4}=\sqrt{45}$ } – по т. Пифагора

$CH=\sqrt{25-4}=\sqrt{21}$ } из $\triangle HDB$ и $\triangle CHB$.

$\alpha(AFB)\perp CD$, т.к. $FH\perp CD$, $AF\perp CD$ $\Rightarrow \alpha\perp$ оси цилиндра



$OB^2=OH^2+HB^2$ из $\triangle HOB$.

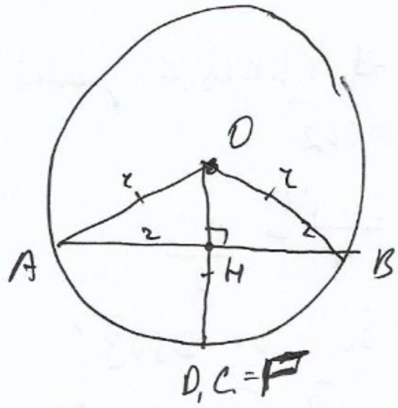
$r^2=(r-h)^2+4$

$r^2=r^2-2hr+h^2+4$

$2hr=h^2+4$

$r=\dfrac{h^2+4}{2h}$

1)



$r'=\dfrac{2h\cdot 2h-2(h^2+4)}{4h^2}=$

$=\dfrac{4h^2-2h^2-8}{4h^2}=\dfrac{2h^2-8}{4h^2}=0$

$\dfrac{(h-2)(h+2)}{h^2}=0$ $h=\pm 2$, $h>0$

$-2 \quad 0 \quad 2 \quad h$ $\Rightarrow h=2$ – min

$r=\dfrac{4+4}{2\cdot 2}=2$

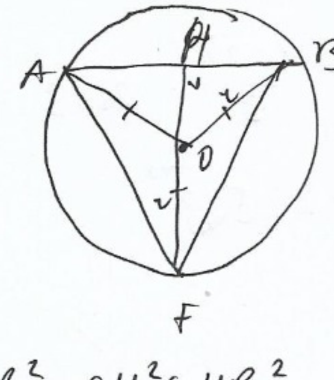
$HF=2$.

$FD=\sqrt{45-4}=\sqrt{41}$ ($\triangle FHD$)

$FC=\sqrt{21-4}=\sqrt{17}$ ($\triangle CHF$)

$CD=FD+FC=\sqrt{41}+\sqrt{17}$

2)



$OB^2=OH^2+HB^2$

$r^2=(h-r)^2+4$

$(-)$ $r^2=(r-h)^2+4$

2

Ответ: $\sqrt{41}+\sqrt{17}$

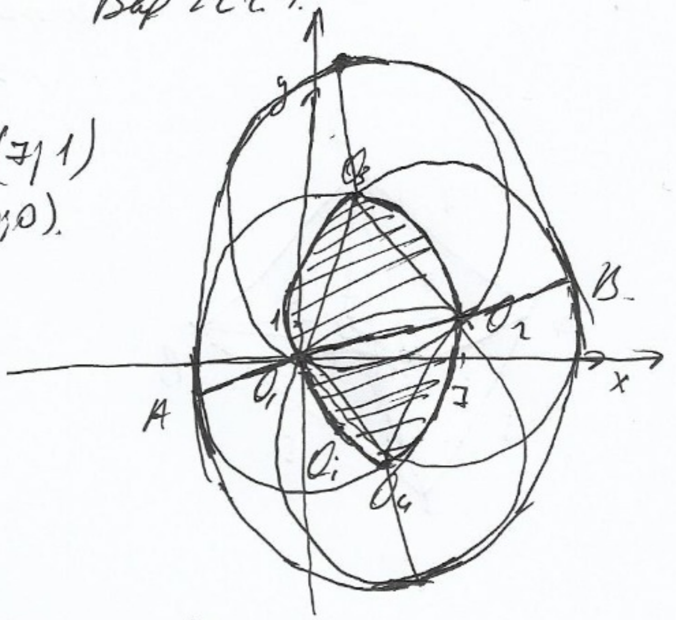
Чистовик Вар 22 ч. 1.

№3.

$$\begin{cases}(x-a)^2+(y-b)^2\le 50\\ a^2+b^2\le 14a+2b\\ a^2+b^2\le 50\end{cases}$$

$O_2(7;1)$

$O_1(0;0)$.

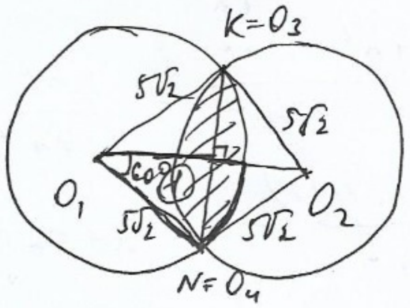


$$\begin{cases}\sqrt{(a-7)^2+(b-1)^2}\le 5\sqrt{2}\\ \sqrt{a^2+b^2}\le 5\sqrt{2}\\ (x-a)+(y-b)^2\le(5\sqrt{2})^2\end{cases}$$

назовём пер. окр. O_1 и O_2 фигурой T, а $\sum\limits_i^{\infty} \cap O_i$ — фигурой F тогда площади T и F относятся как квадраты ~~E~~ линейных элементов, где O_i — окружность с радиусом $=5\sqrt{2}$, а центром $\in T$

$AB = 3O_1O_2 = 3\cdot 5\sqrt{2} \Rightarrow \frac{S_T}{S_F}=\frac{1}{9}$

посчитаем S_T



$KN\perp O_1O_2 \Rightarrow O_1KO_2N$ — ромб.

$NO_2 = O_1O_2 = 5\sqrt{2}$

$S_{O_1O_2N} = \frac{50\cdot\sqrt{3}}{4} = \frac{25\sqrt{3}}{2}$

$S_{O_1KO_2N} = 2S_{O_1O_2N} = 25\sqrt{3}$

$S_{сек.1} = \frac{\pi r^2}{6} = \frac{\pi\cdot 50}{6} = \frac{25\pi}{3}$

$4S_{сек1} = \frac{100\pi}{3}$

$S_T = 4S_{сек1} - S_{O_1KO_2N} = \frac{100\pi}{3} - 25\sqrt{3}$.

$\frac{S_T}{S_F} = \frac{1}{9} \Rightarrow S_F = 9S_T = 300\pi - 225\sqrt{3}$

Ответ: $300\pi - 225\sqrt{3}$.

3

Часть 2

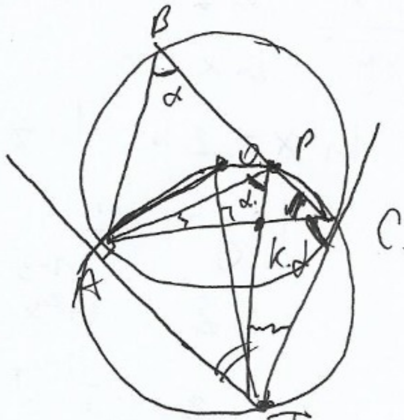
Олимпиада: **Математика, 11 класс (2 часть)**

Шифр: **21101485**

ID профиля: **236254**

Вариант 22

черновик.



$S_{APK} = 7.$

$S_{CPK} = 5.$

$PC = 5 \cdot \sqrt{\frac{5}{7}} = \sqrt{\frac{5}{7}}$

$x^2 = \frac{5}{7}$

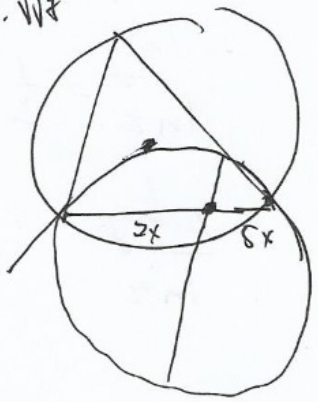
$\frac{120}{98}$ | 22

$\sqrt{\frac{5}{7}} \cdot 5 \cdot 7$

$\frac{35}{245}$

$35 \cdot 2 \cdot \sqrt{5}$

$\frac{7}{5}$ $\frac{14\sqrt{5}}{5}$

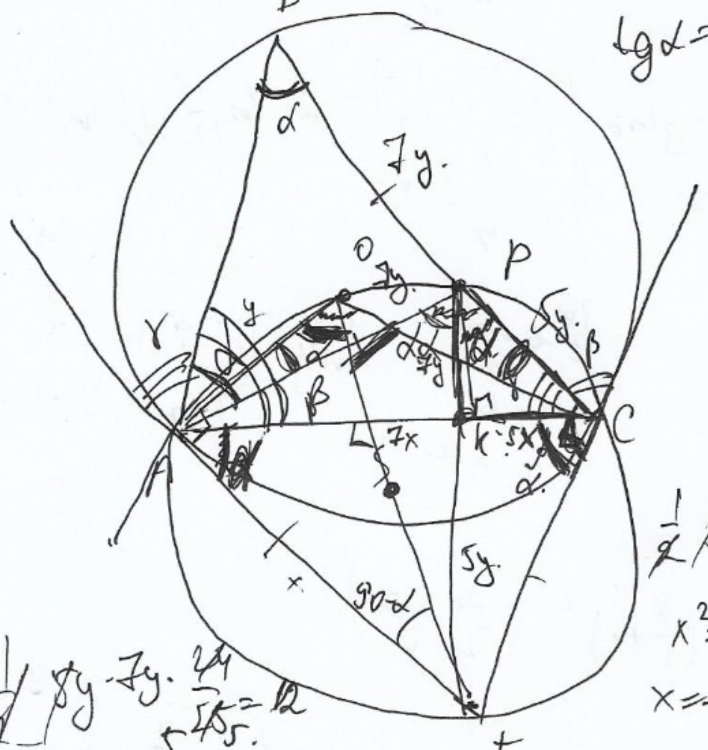


$35 + \frac{125}{7}$ $\frac{14}{98}$

$x^2 = 35 + \frac{25}{7} - \ldots \cdot \frac{5}{\sqrt{7}} \cdot 2 \cdot \frac{7}{\ldots} = 2 \cdot \ldots$

$tg\,\frac{3}{4}$

$tg\alpha = \frac{3}{4}$



$\frac{3 \cdot 16}{2 \cdot 7} = \frac{24}{7}.$

$tg2\alpha = \frac{2tg\alpha}{1 - tg^2\alpha} =$

$= \frac{2 \cdot \frac{3}{4}}{1 - \frac{9}{16}} = \frac{3}{2} \cdot \frac{3}{7}$ $16 - 9 = 7$

$\alpha = 180 - \beta - \gamma.$

$180 - 2\alpha = 180 - 360 + 2\beta + 2\gamma$

$\gamma + \alpha = 180°$ $2\gamma + 2\beta - 180$

$180 - 2\alpha = 2\alpha.$

$\sqrt{\frac{5}{7}}$ $\sqrt{50}$ $\frac{5}{\sqrt{7}}$

$\frac{1}{2} \cdot 5x \cdot 7x \cdot \frac{24}{25} = 12$

$x^2 = \frac{5}{7}$ $7 \cdot 5 = x \cdot y.$ $5y \cdot 7y$ $7x = 7 \cdot \sqrt{\frac{5}{7}} = \sqrt{\frac{5}{7}} \cdot 5 = \sqrt{35}$

$x = \frac{5}{7}$ $\frac{3}{2}$ $576 + 49 = 625$

$\frac{1}{2} \cdot 5y \cdot 7y \cdot \frac{24}{25} = 12$

$y^2 = \frac{5}{7}.$ $\sin^2\alpha + \cos^2\alpha = 1$

$\frac{49}{625}$ 12 $\frac{1}{2} \cdot 5y \cdot 7y \cdot \frac{24}{25} = 12$

$S_{PKC} = \frac{5}{12} \cdot \frac{5}{12} \cdot S_{ABC}$

$y = \sqrt{\frac{5}{7}}$ $1 + tg^2\alpha = \frac{1}{\cos^2\alpha}$ $tg\alpha = \frac{3}{4}.$ $S_{ABC} = \frac{S_{PKC} \cdot 144}{25}$ 24 $y^2 = \frac{1}{35}.$

$\cos\alpha = \sqrt{\frac{1}{1 + tg^2\alpha}} = \sqrt{\frac{1}{1 + \frac{576}{49}}}$ 1 $288.$

$625 - 49.$

$\boxed{\frac{24}{25}}$ 57 $\frac{49}{625} = \boxed{\frac{7}{25}}$ $49 + 576$ $625.$ $\frac{49}{625}.$ $\frac{24}{96}$ $\frac{48}{\ldots}$ $+\frac{576}{49}$ $\frac{2 \cdot \frac{3}{4}}{1 - \frac{9}{16}}$ $\frac{24}{7}$

$1 - \frac{49}{625}.$ 6.25 $\frac{3}{2}$ $\frac{7}{10}$ $\frac{3}{2 \cdot 7}$ 16

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черновик

$2\log_z y = \log_x z - 1$

$\frac{1}{2}\log_y x = \log_x z.$

$\frac{1}{2}\frac{\ln x}{\ln y} = \frac{\ln z}{\ln x}$

$\ln^2 x = 2\ln y \ln z.$

$2\log_z y = \frac{1}{2}\log_y x - 1.$

$\ln y = \frac{\ln^2 x}{2\ln z}.$

$2\frac{\ln y}{\ln z} = \frac{1}{2}\frac{\ln x}{\ln y} - \frac{\ln y}{\ln y}$

$\ln z = \frac{\ln^2 x}{2\ln y}.$

$\ln y = \frac{\ln^2 x}{2\ln z}.$

$\frac{2\ln y}{\ln z} = \frac{\ln x - 2\ln y}{\ln^2 y}$

$c = a - 1.$

$2\log_z y = \frac{1}{2}\log_y x - 1.$

$2\ln^3 y = \ln z \ln x - 2\ln y \ln z$

$\ln^2\left(\frac{7x}{2} - \frac{17}{4}\right) = 2\cdot\ln\left(\frac{x}{2}+1\right)\cdot\ln\left(\frac{3x}{2}-6\right)$

$2\ln^3 y = \ln z \ln x - \ln^2 x.$

$\frac{14x - 17}{4}$

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

$\frac{3x - 12}{2}$

$2\ln^3 y = \frac{\ln^3 x}{2\ln y} - \ln^2 x.$

$\frac{3x}{2} - 6 > 0$

$\frac{3x}{2} > 6$

$3x > 12$

$x > 4$

$\ln^2 y - \ln z \ln y = \ln^3 z.$

$\ln z(\ln^2 z - \ln y) =$

$\ln^2 y.$

$\cancel{2\cdot\frac{\ln^6 x}{8\ln^3 z} = \frac{\ln^3 x}{2\ln y} - \ln^2 x.}$

$\frac{1}{2}$

$\left(\left(\frac{x}{2}+1\right)^2 - \left(\frac{7x}{2} - \frac{17}{4}\right)\right)$

$2\log_z y = 4\log_x z.$

$\frac{\cancel{2}\ln^2 z}{\cancel{2}\ln^2 y} = \frac{\ln\frac{y}{z}}{\ln z}.$

$\frac{\cancel{2}\ln y}{\ln z} = \frac{2\ln z}{\ln x}$

$\ln^3 z = \ln\frac{y}{z}\cdot\ln^2 y.$

$2\ln^2 z = \ln x \ln y.$

$\frac{1}{2}\log_y x = 2\log_z y - 1$

$\frac{\ln x}{2\ln y} = \frac{\cancel{2}(\ln y - \ln z)}{\cancel{2}\ln z}$

$\frac{\ln x}{2\ln y} = \frac{2\ln y}{2\ln z} - \frac{\ln z}{\ln z}$

$\frac{\ln x}{2\ln y} = \frac{\ln y - \ln z}{\ln z}$ $2\ln y$

$\ln x = \frac{2\ln^2 z}{\ln y}.$

черновик

№1.

$НОД(a;b;c)=14=2\cdot 7$

$НОК=2^{17}\cdot 7^{18}$

$a=2^{ta}\cdot 7^{pa}$

$b=2^{tb}\cdot 7^{pb}$

$c=2^{tc}\cdot 7^{pc}$

$\min(ta, tb, tc)=1$

$\min(pa; pb; pc)=1$

$\max(ta; tb; tc)=17$

$\max(pa; pb; pc)=18$

ta tb tc

ta tc tb

3! 1·2·3

ta tb tc

3 · 2 · 1 · 3·2·1

3! · 3!

$a=2^a\cdot 3^b\cdot 4^c$

$b=2^d\cdot 3^e\cdot 4^f$

НОД(

$2\cdot 3^2=18$

$2^2\cdot 3=12$

6 36

1 – 17

1 2 3

1 – 3

17–1+1=17

17·18

t: 1 2–16 17

p: 1 2–17 18

$\frac{3!}{2!}\cdot\frac{3!}{2!}+(16-2+1)(17-2+1)3!3!+$

$3!3!\left(\frac{1}{4}+15\cdot 16+\frac{1}{4}+\frac{1}{2}+\frac{1}{4}\right.$

$3!3!\left(\frac{1}{4}+15\cdot 16+\frac{1}{4}+\frac{1}{2}\cdot 16+\frac{1}{2}\cdot 15+\frac{1}{2}\cdot 16+\frac{1}{2}\cdot 15+\frac{1}{4}+\frac{1}{4}\right)=$

32 + 240

$=3!\,3!\,(1+16+15+15\cdot 16)=$

$6\cdot 6\cdot(272)$

$\boxed{9792}$

272 × 36 = 1632 + 816 = 9792

35 × 7 = 245

245 + 125 = 370

14 × 7 = 98

136, 68·4, 34·8, 17·4·8

370 − 98 = 272

16 × 15 = 80, 240

282 + 98, 272 + 98 = 370

370 − 98

272 / 7

34 × 8 = 272

черновик

~ 2 $x=\frac{7x}{2}-\frac{17}{4}$ $y=\frac{x}{2}+1$ x y z.

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

$a=\log_{(\frac{x}{2}+1)^2}\left(\frac{7x}{2}-\frac{17}{4}\right)$

$b=\log_{\sqrt{\frac{7x}{2}-\frac{17}{4}}}\left(\frac{3x}{2}-6\right)$

$c=\log_{\sqrt{\frac{3x}{2}-6}}\left(\frac{x}{2}+1\right)$.

$a=b$ $c=b-1$.

$a=\frac{1}{2}\log_y x$

$b=\frac{1}{2}\cdot 2\cdot 4\cdot\log_x z$

$c=2\cdot\log_z y$

$2\log_z y=\log_x z-\log_x x$

$\cancel{\log}\ \log_z y^2=\log_x \frac{z}{x}$.

$\frac{\ln x}{2\ln y}=\frac{\ln z}{\ln x}$

$\ln x^2=2\ln z\ln y$.

1) $a=b$ $c=b-1$ 1

$a=b$

$2\frac{1}{2}\log_{(\frac{x}{2}+1)}\left(\frac{7x}{2}-\frac{17}{4}\right)=2\cdot\log_{\frac{7x}{2}-\frac{17}{4}}\left(\frac{3x}{2}-6\right)$

$\frac{1}{2}\log_y x=\log_x z\cdot$ $\ln z=\frac{\ln^2 x}{2\ln y}$.

$\frac{\cancel{\ln\frac{7x}{2}-\frac{17}{4}}}{2\ln\frac{x}{2}+1}=\frac{2\ln\frac{3x}{2}-6}{\cancel{\ln\frac{7x}{2}-\frac{17}{4}}}$ $\log x$

$2\log_z y=\log_x z-1$

$\frac{2\ln y}{\ln z}=\frac{\ln z}{\ln x}-1$

$2\ln_z y=\log_x z-\log_x \cancel{x}$

$4\ln\left(\frac{x}{2}+1\right)\cdot\ln\left(\frac{3x}{2}-6\right)=1$.

$\ln\frac{3x}{2}-6=\frac{1}{4\ln(\frac{x}{2}+1)}$

$2\log_{\sqrt{\frac{3x}{2}-6}}\left(\frac{x}{2}+1\right)=2\log_{\frac{7x}{2}-\frac{17}{4}}\left(\frac{3x}{2}-6\right)-1$.

$2\ln_z y=\log_x\frac{z}{x}$.

$\frac{2\ln\frac{x}{2}+1}{\ln\frac{3x}{2}-6}=\frac{2\ln\frac{3x}{2}-6}{\ln\frac{7x}{2}-\frac{17}{4}}-1$.

$2\cdot\frac{1}{\log_y z}=\log_x z-\cancel{\log}$ $\frac{2\ln y}{\ln z}=\frac{\ln z-\ln x}{\ln x}$.

$\frac{2\ln y\cdot 2\ln y}{\ln^2 x}=\frac{\frac{\ln^2 x}{2\ln y}-\ln x}{\cancel{\ln x}}$

$8\ln^2\left(\frac{x}{2}+1\right)=\frac{2\ln\frac{3x}{2}-6}{\ln\frac{7x}{2}-\frac{17}{4}}-1$

$\frac{4\ln^2 y}{\ln x}=\frac{\ln^2 x-2\ln x\ln y}{2\ln y}$.

$8\ln^2\left(\frac{x}{2}+1\right)=\frac{2}{4\ln(\frac{x}{2}+1)\cdot\ln(\frac{7x}{2}-\frac{17}{4})}-1$

$8\ln^3 y=\ln^3 x-2\ln^2 x\ln y$

$8\ln^3 y-\ln^3 x=-2\ln^2 x\ln y$

$8\ln^2\left(\frac{x}{2}+1\right)=\frac{2-4\ln(\frac{x}{2}+1)\cdot\ln(\frac{7x}{2}-\frac{17}{4})}{\ln(\frac{x}{2}+1)(\ln\frac{7x}{2}-\frac{17}{4})}$

Чистовик. Вар 22 ч.2

№1.

$a = 2^{t_a} \cdot 7^{p_a}$

$b = 2^{t_b} \cdot 7^{p_b}$

$c = 2^{t_c} \cdot 7^{p_c}$

$\min(t_a; t_b; t_c) = 1$

$\min(p_a; p_b; p_c) = 1$

$\max(t_a; t_b; t_c) = 17$

$\max(p_a; p_b; p_c) = 18.$

$\Rightarrow$ один из $t = 1$
один из $p = 1$
один из $t = 17$
один из $p = 18.$
оставшиеся неизвестные
t_x, p_x.

t_x: 1 2-16 17

p_x: 1 2-17 18.

перестановок t_x и p_x $3!\,3!$

1) $1 \div 1.$
$n = \frac{3!\,3!}{2!\,2!}$

2) $(1) \div 2-17$ $n = \frac{3!\,3! \cdot 16}{2!}$

3) $(1) \div (18)$ $n = \frac{3!\,3!}{2!\,2!}$

4) $2-16 \div (1)$ $n = \frac{3!\,3! \cdot 15}{2!}$

5) $2-16 \div 2-17$ $n = 3! \cdot 3! \cdot 15 \cdot 16$

6) $2-16 \div (18)$ $n = \frac{3!\,3! \cdot 15}{2!}$

7) $(17) \div (1)$ $n = \frac{3!\,3!}{2!\,2!}$

8) $(17) \div (2-17)$ $n = \frac{3!\,3! \cdot 16}{2!}$

9) $(17) \div (18)$ $n = \frac{3!\,3!}{2!\,2!}$

$\sum n = 3!\,3!(1+16+15+15 \cdot 16) =$

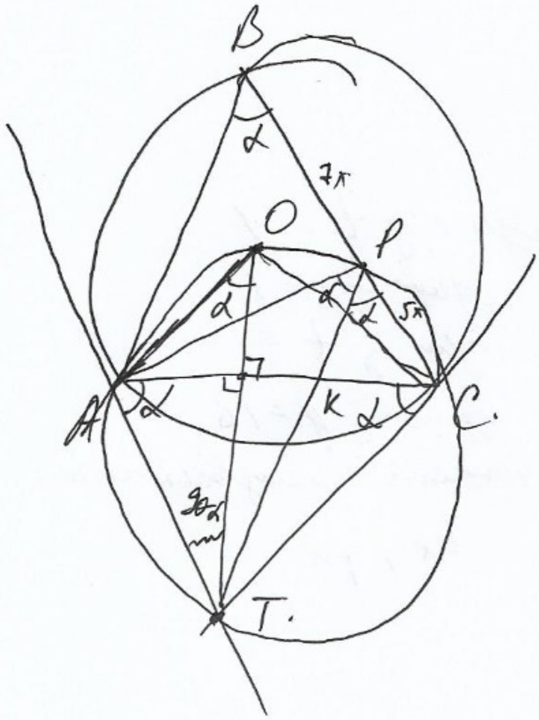
$= 36 \cdot 272$

$$\begin{array}{r} 272 \\ \times\ 36 \\ \hline 1632 \\ 816\ \\ \hline 9792 \end{array}$$

Ответ: 9792

Чистовик   Вар 22 ч 2.

№3



а) пусть $\angle B = \alpha$

тогда $\angle ACT = \alpha$ (угол между хордой и касат.)

$= \angle CAT$

тогда $\angle AOC = 2\alpha$ (центр угол)

$OC \perp AC$, т.к O - центр оп. окр. $\Rightarrow$ лежит на ср. перп.

$OA \perp AT$ - касательная

$\Rightarrow \angle OTA = 90 - \alpha$

$\angle OAT = 90°$ } $\Rightarrow \angle AOT = \alpha$.

т.к. $\angle AOT = \angle ACT$, то т. A, O, C, T лежат на одной окружности

$\Rightarrow A, O, P, C, T$ - лежат на одной окружности.

$\angle APT = \angle ACT = \alpha$ (оп на одну дугу)

$\angle TPC = \angle TAC = \alpha$ (оп на одну дугу).

1) $\triangle APK$ и $\triangle CPK$ - имеют общую высоту $\Rightarrow$ их площади относятся как основания.

$\frac{AK}{KC} = \frac{7}{5}$.

$PC = 5x$.

~~$AP = PC$~~ $BP = 7x$

$\angle BAP = \alpha$. $\Rightarrow BP = AP = 7x$.

2) $\angle TPC = \angle ABC \Rightarrow AB \parallel PT \Rightarrow$

$\Rightarrow \frac{BP}{PC} = \frac{7}{5}$.

$\frac{S_{PKC}}{S_{ABC}} = \frac{5}{12} \cdot \frac{5}{12}$

$S_{ABC} = \frac{S_{PKC} \cdot 144}{25} = \frac{144}{5} = 28,8$.

б) $tg2\alpha = \frac{2tg\alpha}{1-tg^2\alpha} = \frac{24}{7}$.

$\cos 2\alpha = \sqrt{\frac{1}{1+tg^2 2\alpha}} = \frac{7}{25}$

$\sin 2\alpha = \sqrt{1 - \frac{49}{625}} = \frac{24}{25}$.

$\frac{1}{2} 5x \cdot 7x \sin 2\alpha = 12$

$x^2 = \frac{5}{7}$. $x = \frac{\sqrt{5}}{\sqrt{7}}$. $AP = \sqrt{35}$ $PC = \frac{5\sqrt{5}}{\sqrt{7}}$

$AC^2 = AP^2 + PC^2 - 2AP \cdot PC \cdot \cos 2\alpha$ из $\triangle APC$

$t^2 = 35 + \frac{125}{7} - 2 \cdot \frac{\sqrt{5}\sqrt{7} \cdot 5\sqrt{5}}{\sqrt{7}} \cdot \frac{7}{25}$

$t^2 = \frac{245 + 125 - 98}{7}$.

$t = \sqrt{\frac{272}{7}} = 4\sqrt{17}/\sqrt{7}$.

Ответ: а) 28,8 б) $\sqrt{\frac{272}{7}} = 4\sqrt{17}/\sqrt{7}$