Часть 1

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

Шифр: **21103150**

ID профиля: **123010**

Вариант 20

Чистовик. ВАРИАНТ 20.

№ 1.

$S_n = \frac{a_1+a_n}{2} \cdot n = \frac{2a_1+(n-1)d}{2} \cdot n$

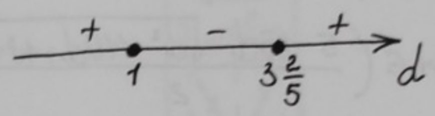
$S = \frac{2a_1+4d}{2} \cdot 5 = 5a_1 + 10d \quad (*)$

$a_6 a_{11} > S + 15$

$(a_1+5d)(a_1+10d) > 5a_1 + 10d + 15$

$a_1^2 + a_1(15d-5) + (50d^2 - 10d - 15) > 0 \quad (1)$

$D = 25d^2 - 110d + 85 = 5(5d-17)(d-1)$



а) $(5d-17)(d-1) < 0$

$d \in (1; 3{,}4) \quad a_1 \in R;$

б) $(5d-17)(d-1) = 0$

1) $d = 1$:

$a_1 = \frac{5-15}{2} = -5$

$a_1 \in (-\infty; -5) \cup (-5; +\infty).$

2) $d = 3{,}4$:

$a_1 = \frac{5 - \cancel{15}^{3} \cdot \frac{17}{\cancel{5}_1}}{2} = -23.$

$a_1 \in (-\infty; -23) \cup (-23; +\infty).$

в) $(5d-17)(d-1) > 0$

$d \in (-\infty; 1) \cup (3{,}4; +\infty)$

$a_1 = \frac{5-15d \pm \sqrt{(5d-17)(5d-5)}}{2} = \left[\begin{array}{l} a_{01} \\ a_{02} \end{array}\right.$

$a_1 \in (-\infty; a_{01}) \cup (a_{02}; +\infty).$

$a_8 a_9 < S + 39$

$(a_1+7d)(a_1+8d) < 5a_1 + 10d + 39$

$a_1^2 + a_1(15d-5) + (56d^2 - 10d - 39) < 0 \quad (2)$

$D = d^2 - 110d + 181$

$D_1 = 55^2 - 181 = 3025 - 181 = 2844$

$d_{1,2} = \frac{55 \pm 6\sqrt{79}}{1} = 55 \pm 6\sqrt{79} > 0$

а) $D < 0 \quad a_1 \in \varnothing;$

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Чистовик. ВАРИАНТ 20.

б) $D=0$ $a_1 \in \varnothing$;

в) $D \geq 0$:

$$a_1 = \frac{5-15d \pm \sqrt{d^2-110d+181}}{2} = \left[\begin{array}{l} a_{01} \\ a_{02} \end{array}\right.$$

$a_1 \in (a_{01}; a_{02})$.

$d \in (-\infty; 55-6\sqrt{79}) \cup (55+6\sqrt{79}; +\infty)$;

$d > (55+6\sqrt{79})$

$$a_1 \in \left(\frac{5-15d-\sqrt{d^2-110d+181}}{2}; \frac{5-15d+\sqrt{d^2-110d+181}}{2}\right).$$

Ответ: $a_1 \in \left(\frac{5-15d-\sqrt{d^2-110d+181}}{2}; \frac{5-15d+\sqrt{d^2-110d+181}}{2}\right)$ при

$d > (55+6\sqrt{79})$; $a_1, d \in Z$. ~~$d \geq 1$~~.

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21103150 (U123010 M1295879)

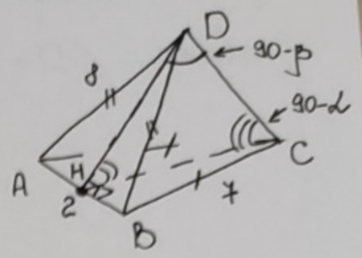
Чистовик. ВАРИАНТ 20.

№ 2.

Дано: $AB = 2$, $AC = CB = 7$, $AD = DB = 8$; R-min.

Найти: CD.

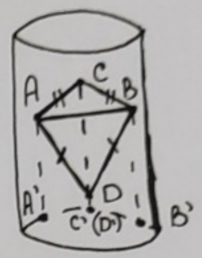
Решение:



1) $\begin{cases} CD < 15 \\ CD > 1 \end{cases} \Rightarrow CD \in (1;15)$ - неравенство Δ.

2) $DH = \sqrt{64-1} = \sqrt{63} = 3\sqrt{7}$;

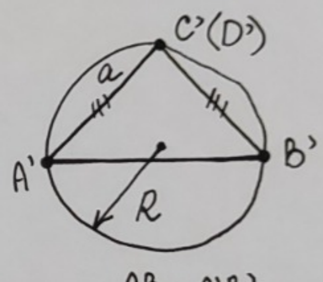
$CH = \sqrt{49-1} = \sqrt{48} = 4\sqrt{3}$;



3) $R = \dfrac{2a^2}{4S_{A'B'C'}}$;

$S_{ABC} = \frac{1}{2}\cdot 2\cdot CH = 4\sqrt{3}$;

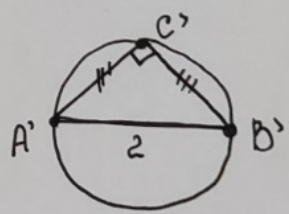
$S_{ADB} = \frac{1}{2}\cdot 2 \cdot DH = 3\sqrt{7}$;



$\left.\begin{aligned} S_{A'B'C'} &= S_{ABC}\cdot\cos\alpha \\ S_{A'B'C'} &= S_{ADB}\cdot\cos\beta \end{aligned}\right| \Rightarrow 4\sqrt{3}\cdot\cos\alpha = 3\sqrt{7}\cdot\cos\beta$; $\dfrac{\cos\alpha}{\cos\beta} = \dfrac{3\sqrt{7}}{4\sqrt{3}}$;

$AB = A'B'$

4) R-min, когда $2R = AB$ (Δ CBD получ. вращ. ΔACD по CD $\Rightarrow$ $AB \parallel$ осн., $AB = A'B'$) $\Rightarrow R = 1$;



$\left.\begin{aligned} &\Delta\, A'C'B' \text{ - р/б} \\ &\angle A'C'B' = 90^\circ \end{aligned}\right| \Rightarrow 2a^2 = 4 \Rightarrow a = \sqrt{2}$;

$S_{A'C'B'} = \frac{1}{2}\cdot a^2 = 1$;

$\cos\alpha = \dfrac{1}{4\sqrt{3}} = \dfrac{\sqrt{3}}{12}$; $\cos\beta = \dfrac{1}{3\sqrt{7}} = \dfrac{\sqrt{7}}{21}$;

5) $\angle DHC = \alpha+\beta$

$\cos(\alpha+\beta) = \cos\alpha\cos\beta - \sin\alpha\sin\beta = \dfrac{\sqrt{3}}{12}\cdot\dfrac{\sqrt{7}}{21} - \sqrt{1-\dfrac{1}{48}}\cdot\sqrt{1-\dfrac{1}{63}} =$

$= \dfrac{\sqrt{21}}{12\cdot 21} - \sqrt{\dfrac{47}{\cancel{48}_{24}}\cdot\dfrac{\cancel{62}^{31}}{63}} = \dfrac{\sqrt{21}}{12\cdot 21} - \dfrac{1}{2\cdot 3}\sqrt{\dfrac{47\cdot 31}{42}} = \dfrac{\sqrt{21}}{12\cdot 21} - \dfrac{\sqrt{47\cdot 31\cdot 42}}{2\cdot 3\cdot 42} = \dfrac{\sqrt{21} - \sqrt{47\cdot 31\cdot 42}}{12\cdot 21}$;

$CD = \sqrt{63+48 - 2\cdot\cancel{3}\sqrt{\cancel{7}}\cdot\cancel{4}\sqrt{\cancel{3}}\cdot\dfrac{\sqrt{21}-\sqrt{47\cdot 31\cdot 42}}{\cancel{12}\cdot\cancel{21}\,\sqrt{21}}} = \sqrt{111 - \dfrac{2\cdot\cancel{\sqrt{21}}\left(1-\sqrt{2\cdot 47\cdot 31}\right)}{\cancel{\sqrt{21}}}} =$

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Чистовик. ВАРИАНТ 20.

$= \sqrt{111 - 2 + 2\sqrt{2 \cdot 47 \cdot 31}} = \sqrt{109 + 2\sqrt{2914}}$; $CD^2 \in (1; 225)$.

Ответ: $CD = \sqrt{109 + 2\sqrt{2914}}$.

(4)

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21103150 (U123010 M1295879)

Черновик.

№ 1.

$a_n = a_1 + (n-1)d$ – возраст., $a \in Z$.

$S_n = \frac{a_1 + a_n}{2} \cdot n = \frac{2a_1 + (n-1)d}{2} \cdot n$

$S = \frac{2a_1 + 4d}{2} \cdot 5 = (a_1 + 2d) \cdot 5$; (*)

$a_6 a_{11} > S + 15$

$(a_1 + 5d)(a_1 + 10d) > 5a_1 + 10d + 15$

$a_1^2 + 5a_1 d + 10a_1 d + 50d^2 > 5a_1 + 10d + 15$

$a_1^2 + 15a_1 d + 50d^2 > 5a_1 + 10d + 15$

$a_1^2 + a_1(15d - 5) + (50d^2 - 10d - 15) > 0$ (1)

$D = (15d-5)^2 - 4(50d^2 - 10d - 15) = 225d^2 - 150d + 25 - 200d^2 + 40d + 60 = 25d^2 - 110d + 85$

$25d^2 - 110d + 85 = (5d - 11)^2 - 36 = (5d - 17)(5d - 5)$

а) $(5d - 17)(d - 1) < 0$ б) $(5d-17)(d-1) = 0$ в) $(5d-17)(d-1) > 0$

$a_1 \in$ [redacted] R $a_1 \in (-\infty; ?) \cup (?; +\infty)$ $a_1 \in (-\infty; ??) \cup (???; +\infty)$.

$a_8 a_9 < S + 39$

$(a_1 + 7d)(a_1 + 8d) < 5a_1 + 10d + 39$

$a_1^2 + 7a_1 d + 8a_1 d + 56d^2 < 5a_1 + 10d + 39$

$a_1^2 + a_1(15d - 5) + (56d^2 - 10d - 39) < 0$ (2)

$D = (15d-5)^2 - 4(56d^2 - 10d - 39) = 225d^2 - 150d + 25 - 224d^2 + 40d + 156 = d^2 - 110d + 181$ [redacted]

$D_1 = 55^2 - 181$

$181 =$

. . .

$8 < \sqrt{79} < 9$

$48 < 6\sqrt{79} < 54$

55×55: 275, 275, 3025; $3025 - 181 = 2844$

$2844 = 4 \cdot 711 = 4 \cdot 9 \cdot 79$

~~13,3~~ ~ 17.

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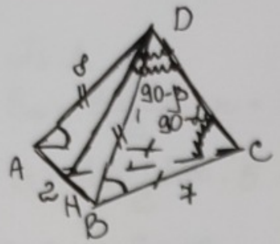
№2. Черновик

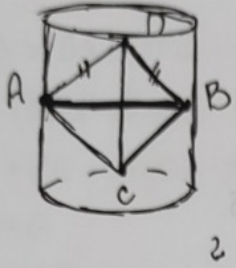


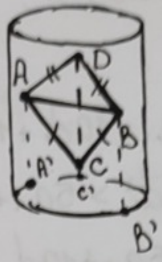
1) $CD < 15$ $(\triangle BDC)$

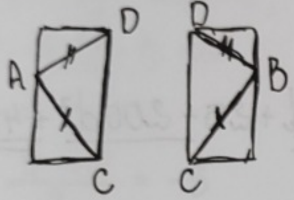
$7 + CD > 8 \Rightarrow CD > 1$

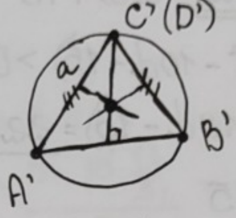
$CD \in (1; 15)$

$CD^2 \in (1; 225)$









$S_{ACB} = \frac{1}{2} \cdot 2 \cdot \sqrt{49-1} =$

$= \sqrt{48} = 4\sqrt{3};$

$S_{ADB} = \frac{1}{2} \cdot 2 \cdot \sqrt{64-1} =$

$= \sqrt{63} = 3\sqrt{7};$

$S_{пр.} = S \cdot \cos\alpha$

$4\sqrt{3} \cdot \cos\alpha = 3\sqrt{7} \cdot \cos\beta$

$\frac{\cos\alpha}{\cos\beta} = \frac{3\sqrt{7}}{4\sqrt{3}} = \frac{\sqrt{21}}{4} \Rightarrow \cos\alpha = \frac{\sqrt{21}}{4} \cdot \cos\beta.$

$$\begin{array}{r} 131 \\ \times 131 \\ \hline 131 \\ 393 \\ 131 \\ \hline 17161 \end{array}$$

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

$R - \min \Rightarrow a - \min$

$\angle DHC = \cancel{180} - \cancel{90} + \beta - \cancel{90} + \alpha = \alpha + \beta.$

$CD^2 = 63 + 48 - 2 \cdot 4\sqrt{3} \cdot 3\sqrt{7} \cdot \cos(\alpha+\beta) = 111 - 24\sqrt{21} \cdot \cos(\alpha+\beta)$

$\cos(\alpha+\beta) = \cos\alpha\cos\beta - \sin\alpha\sin\beta = \cos\beta \cdot \frac{\sqrt{21}}{4} \cdot \cos\beta - \sqrt{1 - \frac{21}{16}\cos^2\beta} \cdot$
$\cdot \sqrt{1-\cos^2\beta} = \frac{\sqrt{21} \cdot \cos^2\beta}{4} - \sqrt{\left(1 - \frac{21}{16}\cos^2\beta\right)(1-\cos^2\beta)}$

$$\begin{array}{r} 1457 \\ \times 2 \\ \hline 2914 \end{array} \qquad \begin{array}{r} 39 \\ \times 39 \\ \hline 351 \\ 117 \\ \hline 1521 \end{array}$$

$\sin\alpha = \sqrt{1 - \frac{21}{16}\cos^2\beta} =$;

$$\begin{array}{r} 98 \\ \times 98 \\ \hline 784 \\ 882 \end{array} \qquad \begin{array}{r} 47 \\ \times 31 \\ \hline 47 \\ 141 \\ \hline 1457 \end{array}$$

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21103150 (U123010 M1295879)

Черновик

$$\begin{cases} d \in (-\infty;\ \overset{(1;\,7)}{55 - 6\sqrt{79}}) \cup (\overset{(103;\,109)}{55 + 6\sqrt{79}};\ +\infty). \\ \end{cases}$$

$a_1 \in (a_{01}; a_{02})$

$\boxed{d \geq 108}$

① $d \in (1; 3{,}4)$ $a_1 \in (a_{01}; a_{02})$

② $d = 1$

$\sqrt{72} = \sqrt{9 \cdot 4 \cdot 2}$

$$a_1 = \frac{-10 \pm \sqrt{182 - 110}}{2} = \frac{-10 \pm 6\sqrt{2}}{2} = -5 \pm 3\sqrt{2}$$

$d = 3{,}4$

$\boxed{d \geq 4}$ $\boxed{d = 2}$ $\boxed{d = 3}$

185-220

$a_1 =$

$$a_1 = \frac{5 - 30 \pm \sqrt{4 - 220 + 181}}{2} =$$

$= -25 \pm$

21103150 (U123010 M1295879)

Часть 2

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

Шифр: **21103150**

ID профиля: **123010**

Вариант 20

Чистовик. ВАРИАНТ 20.

№ 5.

$\log_{\sqrt{2x-8}}(x-4)$, $\log_{(x-4)^2}(5x-26)$, $\log_{\sqrt{5x-26}}(2x-8)$

• ограничения:

$2x-8>0$ | $x \neq 4$ | | $x \neq 5\frac{2}{5}$ | $x \in (5,2;\ 5,4) \cup (5,4;\ +\infty)$.

$x>4;$ | $x \neq 5$ | $x > 5\frac{1}{5}$ |

$x \neq 4,5;$ | $x \neq 3$ | |

$\log_{\sqrt{2x-8}}(x-4) \cdot \log_{(x-4)^2}(5x-26) \cdot \log_{\sqrt{5x-26}}(2x-8) = 2\log_{2x-8}(x-4) \cdot \frac{1}{2}\log_{x-4}(5x-26) \cdot$

$\cdot 2\log_{5x-26}(2x-8) = 2\log_{5x-26}(2x-8) \cdot \log_{2x-8}(5x-26) = 2$

$2 = y^2 \cdot (y+1)$ – где y – одно из равных чисел.

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

$$\begin{array}{r|l} y^3+y^2-2 & y-1 \\ -\underline{y^3-y^2} & y^2+2y+2 \\ 2y^2-2 & \\ -\underline{2y^2-2y} & \\ 2y-2 & \\ -\underline{2y-2} & \\ 0 & \end{array}$$

$(y-1)(y^2+2y+2)=0$

$D_1 = 1-2<0 \Rightarrow y^2+2y+2>0$

$y=1.$

пусть $\log_{\sqrt{2x-8}}(x-4)=1$:

$\sqrt{2x-8} = x-4$

$2x-8 = x^2-8x+16$

$x^2-10x+24=0$

$(x-5)^2-1=0$

$(x-6)(x-4)=0$

$\left[\begin{array}{l} x=6 \\ x=4 \text{ (не уд.)} \end{array}\right.$

$x=6$, тогда:

$\log_{(x-4)^2}(5x-26) = \log_4 4 = 1 = \log_{\sqrt{2x-8}}(x-4)$;

$\log_{\sqrt{5x-26}}(2x-8) = \log_2 4 = 2.$

пусть $\log_{(x-4)^2}(5x-26)=1$

$x^2-8x+16 = 5x-26$

$x^2-13x+42=0$

$D = 169-168=1$

$x_{1,2} = \frac{13 \pm 1}{2} = \left[\begin{array}{l} 7 \\ 6 \end{array}\right.$

$x=7$, тогда:

$\log_{\sqrt{2x-8}}(x-4) = \log_{\sqrt{6}} 3$

$\log_{\sqrt{5x-26}}(2x-8) = \log_3 6.$

Чистовик. Вариант 20.

пусть $\log_{\sqrt{5x-26}}(2x-8)=1$:

$5x-26=4x^2-32x+64$

$4x^2-37x+90=0$

$D=1369-1440<0$

$x\in\varnothing$.

Ответ: $x=6$.

2

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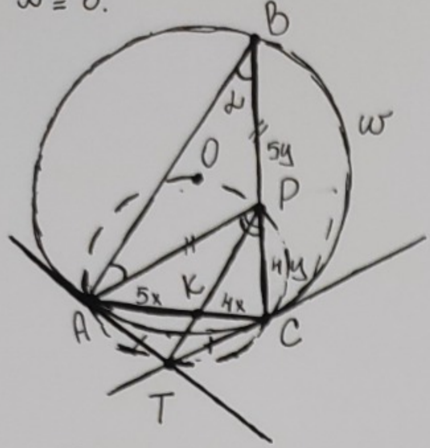
21103150 (U123010 M1295880)

Чистовик. ВАРИАНТ 20.

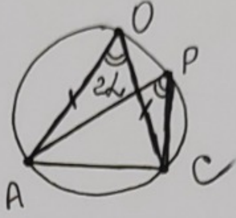
№ 6.



Дано: $S_{APK} = 10$, $S_{CPK} = 8$.

а) Найти: S_{ABC}.

б) Найти: AC, если $\angle ABC = \operatorname{arctg}\frac{1}{2}$.



а) Решение:

1) $AT = TC$ (как отр. кас.);

2) $S_{APK} = \frac{1}{2}\cdot AK\cdot h$, $S_{KPC} = \frac{1}{2}\cdot KC\cdot h$ $\Rightarrow \frac{AK}{KC} = \frac{S_{APK}}{S_{KPC}} = \frac{10}{8} = \frac{5}{4}$;

3) $S_{ABC} = \frac{1}{2}\cdot BC\cdot h$, $S_{APC} = \frac{1}{2}\cdot PC\cdot h = 18$ $\Rightarrow \frac{BC}{PC} = \frac{S_{ABC}}{18} \Rightarrow S_{ABC} = 18\cdot\frac{BC}{PC}$;

4) $\angle APC = 2\alpha$, $\angle ABP = \alpha \Rightarrow \angle BAP = \alpha \Rightarrow AP = BP$;

$AT = TC \Rightarrow \angle APT = \angle CPT = \frac{2\alpha}{2} = \alpha$;

$\angle CPT = \alpha = \angle CBA \Rightarrow PT \parallel AB \Rightarrow \frac{CK}{AK} = \frac{CP}{BP} = \frac{4}{5}$;

5) $S_{ABC} = 18\cdot\frac{BC}{PC} = \cancel{18}^{9}\cdot\frac{9}{\cancel{4}_2} = \frac{81}{2} = 40{,}5$

Ответ: $S_{ABC} = 40{,}5$.

б) Решение:

1) $S_{APC} = \frac{1}{\cancel{2}_1}\cdot 5y\cdot \cancel{4}^{2}y\cdot \sin 2ABC = \cancel{10}^{2}y^2\cdot 2\cdot\frac{1}{\cancel{\sqrt5}}\cdot\frac{2}{\cancel{\sqrt5}} = 8y^2 = 18$

$y^2 = \frac{18}{8} = \frac{9}{4} \Rightarrow y = \frac{3}{2}$; $5y = \frac{15}{2}$, $4y = 6$;

$AC = \sqrt{\frac{225}{4} + 36 - \cancel{2}\cdot\frac{15}{\cancel{2}}\cdot 6\cdot(2\cos^2 ABC - 1)} = \sqrt{\frac{225}{4} + 36 - 90\cdot\left(2\cdot\frac{4}{5} - 1\right)} =$

$= \sqrt{\frac{225}{4} + 36 - 144 + 90} = \sqrt{\frac{225}{4} - 18} = \sqrt{\frac{225-72}{4}} = \sqrt{\frac{153}{4}} = \sqrt{\frac{9\cdot 17}{4}} = \frac{3}{2}\sqrt{17}$.

3

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Чистовик. Вариант 20.

Ответ: $AC = 1{,}5\sqrt{17}$.

Чистовик. ВАРИАНТ 20.

№ 4.

$a = 10x$

$b = 10y$

$c = 10z$

$НОК(a;b;c) = 10xyz = 10^{16} \cdot 2$

$xyz = 2 \cdot 10^{15}$

5

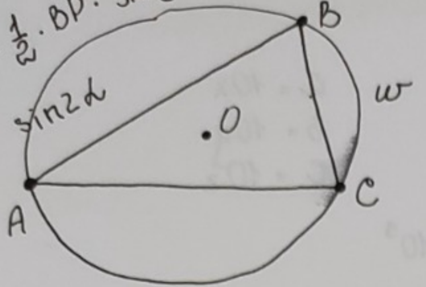
2021/3/7 15:05

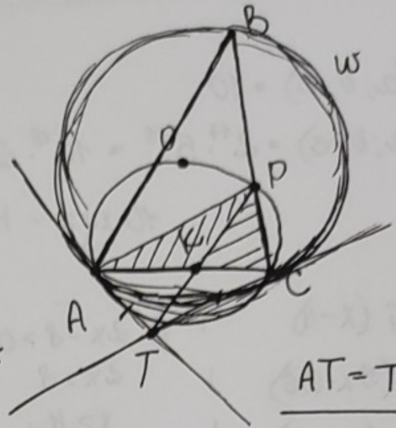
21103150 (U123010 M1295880)

$\omega \doteq 6.$ Черновик.

$S_{APB} = \frac{1}{2} \cdot BP^2 \cdot \sin(180-2\alpha)$

$= \frac{1}{2} \cdot BP^2 \cdot \sin 2\alpha$



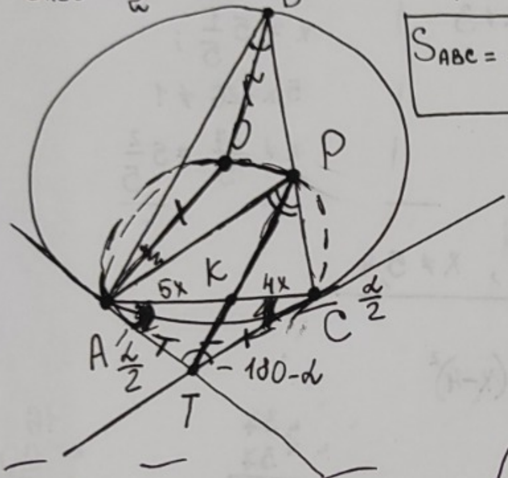


$S_{ABC} - ?$

$\underline{AT = TC}$!

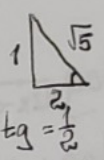
$S_{APC} = \frac{1}{2} \cdot AC \cdot PC \cdot \sin ACB$
$S_{ABC} = \frac{1}{2} \cdot AC \cdot BC \cdot \sin ACB$ $\Bigg| \Rightarrow \frac{S_{ABC}}{S_{APC}} = \frac{BC}{PC}$

$\boxed{S_{ABC} = \frac{BC}{PC} \cdot 18}$



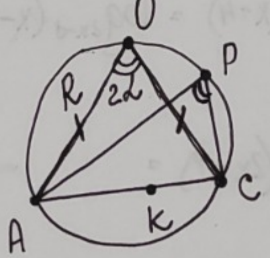
$S_{APK} = \frac{1}{2} \cdot AK \cdot h$
$S_{KPC} = \frac{1}{2} \cdot KC \cdot h$ $\Bigg| \Rightarrow \frac{10}{8} = \frac{AK}{KC}$

$AK : KC = 5 : 4$!



$\frac{AK}{AP} = \frac{KC}{PC}$;

д-то: $\frac{AP}{PC} = \frac{5}{4}$!



$180 - 180 + 2\alpha - \alpha = \alpha$

$S_{ABC} = \frac{1}{2} \cdot BC \cdot h$

$S_{APC} = \frac{1}{2} \cdot PC \cdot h = 18 \Rightarrow PC \cdot h = 36 \Rightarrow h = \frac{36}{PC}$ $\Bigg| \Rightarrow S_{ABC} = \frac{1}{2} \cdot BC \cdot \frac{36}{PC} =$

$= 18 \cdot \frac{BC}{PC}$.

$S_{AOC} = \frac{1}{2} \cdot AC \cdot \sqrt{R^2 - \frac{AC^2}{4}} = \frac{AC}{4}\sqrt{4R^2 - AC^2}$;

$126 - 144 = -18$

$r = \frac{\cancel{AC} \cdot R^2}{\cancel{4} \cdot \frac{\cancel{AC}}{\cancel{4}} \sqrt{4R^2 - AC^2}} = \frac{R^2}{\sqrt{4R^2 - AC^2}}$;

$S_{APK} = \frac{1}{2} AP \cdot KP \cdot \sin APK$
$S_{KPC} = \frac{1}{2} \cdot PC \cdot KP \cdot \sin KPC$ $\Bigg| \Rightarrow$

$S_{APC} = \frac{AP \cdot PC \cdot AC\sqrt{4R^2 - AC^2}}{4R^2} = 18$

$\begin{array}{r} 18 \\ \times\ 8 \\ \hline 144 \end{array}$

$\Rightarrow \frac{10}{8} = \frac{AP \cdot \sin APK}{PC \cdot \sin KPC}$

$AP \cdot PC \cdot AC\sqrt{4R^2 - AC^2} = 4R^2 \cdot 18$

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Черновик.

№ 4.

$$\begin{cases} НОД(a;b;c) = 10 \\ НОК(a;b;c) = 2^{17} \cdot 5^{16} = 10^{16} \cdot 2 \end{cases}$$

$a = 10x$
$b = 10y$
$c = 10z$

$10xyz$ - НОК
$xyz = 2 \cdot 10^5$

№ 5.

① $\log_{\sqrt{2x-8}}(x-4)$
② $\log_{(x-4)^2}(5x-26)$
③ $\log_{\sqrt{5x-26}}(2x-8)$

1) $2x-8>0$
$2x>8$
$x>4$;
$2x-8 \neq 1$
$x \neq 4,5$

2) $x \neq 4$
$x \neq 5$
$x \neq 3$

3) $5x-26>0$
$5x>26$
$x > 5\frac{1}{5}$;
$5x-26 \neq 1$
$x \neq \frac{27}{5} \neq 5\frac{2}{5}$

$x > 5,2$, $x \neq 5,4$

1 $\log_{\sqrt{2x-8}}(x-4) = 2\log_{2x-8}(x-4) = \log_{2x-8}(x-4)^2$
2 $\log_{(x-4)^2}(5x-26)$
3 $\log_{\sqrt{5x-26}}(2x-8) = 2\log_{5x-26}(2x-8) =$

$$\begin{array}{r} 37 \\ \times 37 \\ \hline 259 \\ +111 \\ \hline 1369 \end{array} \qquad \begin{array}{r} 16 \\ \times 90 \\ \hline 1440 \end{array}$$

1 = 2 :
$\log_{2x-8}(x-4)^2 \cdot \log_{(x-4)^2}(5x-26) = \log^2_{2x-8}(x-4)^2$
$\log_{2x-8}(5x-26) = \log^2_{2x-8}(x-4)^2$

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① = ② : $\log_{\sqrt{2x-8}}(x-4) = \log_{(x-4)^2}(5x-26)$
$2\log_{2x-8}(x-4) = \log_{(x-4)^2}(5x-26)$
$\cancel{\log_{2x-8}(x-4)^2} = \dfrac{1}{\log_{(x-4)^2}(2x-8)} = \log_{(x-4)^2}(5x-26)$

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