DTM tomonidan tomonidan taqdim qilingan namunaviy testlar
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Yechimlar Usmonov.M tomonidan yechilgan.
Loyiha muallifi :
@PulatovDilmurodHalimbayvich

(3) $\dfrac{1+\frac{a}{b}}{1+\frac{b}{a}} = \dfrac{\frac{b+a}{b}}{\frac{a+b}{a}} = \dfrac{a}{b} = \dfrac{a_{max}}{b_{min}} = \dfrac{5}{3}$ (B)

(4) $\left(1\frac{1}{7}\right)\cdot\left(1\frac{1}{8}\right)\cdot\left(1\frac{1}{9}\right)\cdot\ldots\cdot\left(1\frac{1}{62}\right) =$

$= \frac{8}{7}\cdot\frac{9}{8}\cdot\frac{10}{9}\cdot\frac{11}{10}\cdot\frac{12}{11}\cdot\frac{13}{12}\cdot\ldots\cdot\frac{61}{60}\cdot\frac{62}{61}\cdot\frac{63}{62} =$

$= \frac{63}{7} = 9$ (A)

(5) $\frac{\overline{x734y}}{55}$ = натурал сон.

$\Sigma x = ?$

55 га бўлинган сонлар:
5 ва 11 га қолдиқсиз бўлинган сон. 55 га қолдиқсиз бўлинади.
$\overline{x734y}$ 5 га бўлинган учун
$y = 0$ ёки $y = 5$ бўлиши керак.

Демак: $\frac{\overline{x7340}}{11}$ = натурал

$\frac{x7345}{11}$ = натурал.

а) $\overline{x7340}$ 11 га қолдиқсиз бўлиниш учун: $\frac{(x+3+0)-(7+4)}{11}$ = бутун сон.

$x \in N$ ва $x \leq 9$

$\frac{(x+3+0)-(7+4)}{11} = \frac{x+3-11}{11} = \frac{x-8}{11}$ = бутун.

Демак: $x = 8$

б) $x7345$ 11 га қолдиқсиз бўлиниш учун: $\frac{(x+3+5)-(7+4)}{11}$ = бутун.

$\frac{x+3+5-(7+4)}{11} = \frac{x+8-11}{11} = \frac{x-3}{11}$ = бутун.

Демак: $x = 3$.

$\Sigma x = 8 + 3 = 11$.

(A)

⑥ $\frac{1}{2}+\frac{2}{3}+\frac{3}{2}+\frac{4}{3}+\frac{5}{2}+\frac{6}{3}+\frac{7}{2}+\frac{8}{3}+\dots+\frac{15}{2}+\frac{16}{3}=$

$=\frac{1+3+5+\dots+15}{2}+\frac{2+4+6+\dots+16}{3}=$

$=\frac{\frac{1+15}{2}\cdot 8}{2}+\frac{\frac{2+16}{2}\cdot 8}{3}=\frac{64}{2}+\frac{18\cdot 4}{3}=$

$=32+6\cdot 4=32+24=56$ (D)

⑦ $(x^2+x)+(x^2+2x)+\dots+(x^2+19x)=1425$

$a_1=x^2+x$

$d=x$

$a_n=x^2+19x$

$S_n=1425$

$x\in N$

$x=?$

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

$x^2+19x=x^2+x+x(n-1)$

$18=n-1\Rightarrow n=19$

$S_n=\frac{a_1+a_n}{2}\cdot n=1425$

$\frac{x^2+x+x^2+19x}{2}\cdot 19=1425$

$2x^2+20x=150$

$x^2+10x-75=0$

$(x+15)(x-5)=0$

$x=5\Rightarrow x\in N$

(C)

⑧ $tg\alpha\cdot tg\beta+(tg\alpha+tg\beta)\cdot ctg(\alpha+\beta)=$

$=tg\alpha\cdot tg\beta+(tg\alpha+tg\beta)\cdot\frac{1}{tg(\alpha+\beta)}=$

$=tg\alpha\cdot tg\beta+(tg\alpha+tg\beta)\cdot\frac{1-tg\alpha tg\beta}{tg\alpha+tg\beta}=$

$=tg\alpha\cdot tg\beta+1-tg\alpha tg\beta=1$

(B)

(9) $\sin 1^\circ + \sin 2^\circ + \sin 3^\circ + \dots + \sin 359^\circ =$

$= \sin 1^\circ + \sin 2^\circ + \sin 3^\circ + \sin 4^\circ + \dots + \sin 180^\circ + \dots +$

$+ \sin 356^\circ + \sin 357^\circ + \sin 358^\circ + \sin 359^\circ =$

$= \sin 1^\circ + \sin 2^\circ + \sin 3^\circ + \sin 4^\circ + \dots + \sin 180^\circ + \dots +$

$+ \sin(360^\circ - 4^\circ) + \sin(360^\circ - 3^\circ) + \sin(360^\circ - 2^\circ) + \sin(360^\circ - 1^\circ)$

$= \sin 1^\circ + \sin 2^\circ + \sin 3^\circ + \sin 4^\circ + \dots + \sin 180^\circ + \dots +$

$+ \sin 4^\circ - \sin 3^\circ - \sin 2^\circ - \sin 1^\circ =$

$= \sin 180^\circ = 0$ (D)

(10) $x < -2$

$\sqrt{x^2+6x+1+\sqrt{9-12x+4x^2}} =$

$= \sqrt{x^2+6x+1+\sqrt{(3-2x)^2}} = \sqrt{x^2+6x+1+|3-2x|}$

$= \left| \begin{array}{l} x<-2 \text{ olduğu üçün,} \\ |3-2x| = 3-2x \end{array} \right| = \sqrt{x^2+6x+1+3-2x} =$

$= \sqrt{x^2+4x+4} = \sqrt{(x+2)^2} = |x+2| =$

$= \left| \begin{array}{l} x<-2 \text{ olduğu üçün,} \\ |x+2| = -(x+2) \end{array} \right| = -x-2$ (C)

(11) $2^a = 81 \Rightarrow a = \log_2 81 = \log_2 3^4 = 4\log_2 3$

$3^b = 8 \Rightarrow b = \log_3 8 = \log_3 2^3 = 3\log_3 2$

$a \cdot b = (4\log_2 3) \cdot (3\log_3 2) =$

$= 4 \cdot \log_2 3 \cdot 3 \cdot \frac{1}{\log_2 3} = 12$ (B)

(12) $\dfrac{a^4-10a^2+169}{a^2+6a+13} = a^2-6a+13$

$$
\begin{array}{l|l}
-\,a^4-10a^2+169 & a^2+6a+13 \\
\underline{\;a^4+6a^3+13a^2\;} & \overline{a^2-6a+13} \\
-\,-6a^3-23a^2+169 & \\
\underline{\;-6a^3-36a^2-78a\;} & \\
-\,13a^2+78a+169 & \\
\underline{\;13a^2+78a+169\;} & \\
0 &
\end{array}
$$

$$\frac{a^4-10a^2+169}{a^2+6a+13} = \frac{a^4+26a^2+169-36a^2}{a^2+6a+13} =$$

$$= \frac{(a^2+13)^2-(6a)^2}{a^2+6a+13} = \frac{(a^2+13-6a)(a^2+13+6a)}{a^2+13+6a} =$$

$$= a^2-6a+13 \quad \text{(C)}$$

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(13) $\frac{9x^2-6x+1}{9} = (x+a)^2.$

$x^2-\frac{2}{3}x+\frac{1}{9} = (x+a)^2.$

$(x-\frac{1}{3})^2 = (x+a)^2. \Rightarrow -\frac{1}{3} = a$ (A)

(14) $(a^2-2a+1)x = a^2+2a-3$

$(a-1)^2 x = (a-1)(a+3)$

$a=1$ бұлса $0^2 \cdot x = 0 \cdot 4 = 0 = 0$ чексіз көп ерітімі.

(C)

(15) $x^2+(k+2)^2+2k-4=0$

$$x=\frac{-(k+2)^2\pm\sqrt{(k+2)^4-4(2k-4)}}{2}<2$$

$$-(k+2)^2\pm\sqrt{(k+2)^4-8k+16}<4$$

$$\pm\sqrt{(k+2)^4-8k+16}<4+(k+2)^2$$

$$-\sqrt{(k+2)^4-8k+16}<4+(k+2)^2 \Rightarrow k\in R$$

при всех

а неравенство сохранит течение

5 давомы

$$\left(+\sqrt{(k+2)^4-8k+16}\right)^2 < \left(4+(k+2)^2\right)^2.$$

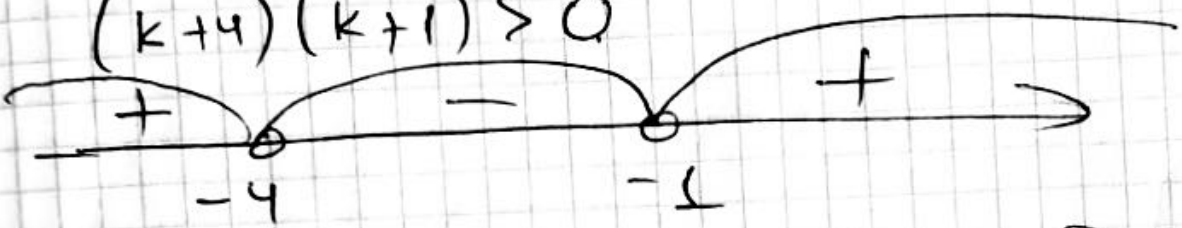
$$(k+2)^4 - 8k + 16 < 16 + 8(k+2)^2 + (k+2)^4$$

$$-8k < 8(k+2)^2 \quad | : 8.$$

$$-k < k^2+4k+4$$

$$k^2+5k+4 > 0$$

$$(k+4)(k+1) > 0$$



$k \in N$ эканлигидан олсак

$k = 1, 2, 3, 4 \ldots$

$k=1$ да $\Rightarrow \sqrt{(k+2)^4 - 8k + 16}$ аниқланган

$k = 1$ ②

$$\left(+\sqrt{(k+2)^4-8k+16}\right)^2 \le \left(4+(k+2)^2\right)^2.$$

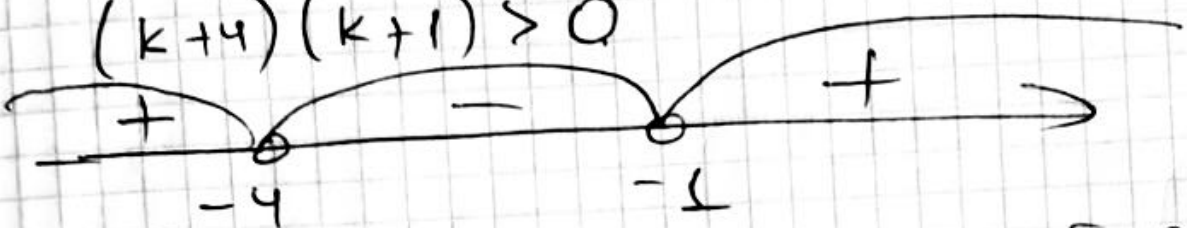
$$(k+2)^4 - 8k + 16 \le 16 + 8(k+2)^2 + (k+2)^4$$

$$-8k \le 8(k+2)^2 \quad | : 8$$

$$-k \le k^2+4k+4$$

$$k^2+5k+4 \ge 0$$

$$(k+4)(k+1) \ge 0$$



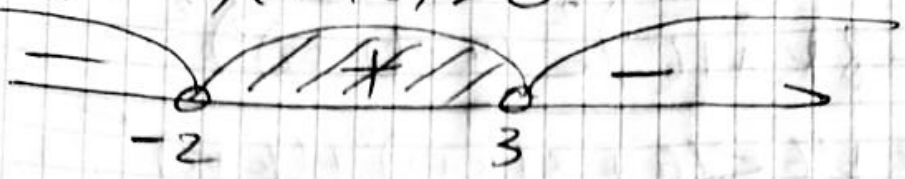
$k \in N$ эканлиги олсак

$k = 1, 2, 3, 4 \ldots$

$k=1$ да $\Rightarrow \sqrt{(k+2)^4 - 8k + 16}$ аниқланган

$k = 1$ (2)

(16) $(3-x)(x+2) \geq 0$



$x \in (-2; 3)$; $x \in Z$. бўлгани учун

$x = -1; 0; 1; 2$.

$\Sigma x = 2$. (C)

(17) $f(x) = \begin{cases} -x+2, & x<2 \\ \frac{x-1}{2}, & x \geq 2 \end{cases}$

$f(-1) \Rightarrow x<2$ бўлгани учун $f(x)=-x+2$ га асосан

$f(-1) = -(-1)+2 = 3$

$f(f(-1)) = f(3) \Rightarrow x=3, x \geq 2$ бўлгани учун $f(x) = \frac{x-1}{2}$ га асосан

$f(3) = \frac{3-1}{2} = 1$. Жавоб: 1 (C)

(18) $f(x) = (a+b-4)\cdot x^3 + 2x^2 + (b-1)\cdot x$

$f(x)$ тўғри бўлиши учун

$\begin{cases} a+b-4=0 \\ b-1=0 \end{cases}$ бўлиши керак $\Rightarrow \begin{cases} a=3 \\ b=1 \end{cases}$

бунда $f(x) = 2x^2$ бўлади.

$f(a) = f(3) = 2\cdot 3^2 = 18$ (D)

(19) $\int_1^2 \left(e^x + \frac{1}{x}\right) dx = e^x + \ln x \Big|_1^2 =$

$= e^2 + \ln 2 - (e^1 + \ln 1) = e^2 + \ln 2 - e =$

$= e^2 - e + \ln 2$ (B)

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(20) $\int \frac{3\,dx}{x \ln 2x} = \int 3 \cdot \frac{1}{\ln 2x} \cdot \frac{1}{x} dx =$

$= \int 3 \cdot \frac{1}{\ln 2x} \cdot d(\ln 2x) = \left| \ln 2x = t \right| =$

$= \int 3 \cdot \frac{1}{t} dt = 3 \ln t = \boxed{3 \ln(\ln 2x) + C}$ (D)

Tek: $(3 \ln(\ln 2x) + C)' = 3 \cdot \frac{1}{\ln 2x} (\ln 2x)' =$

$= 3 \cdot \frac{1}{\ln 2x} \cdot \frac{1}{x} = \frac{3}{x \ln 2x}$

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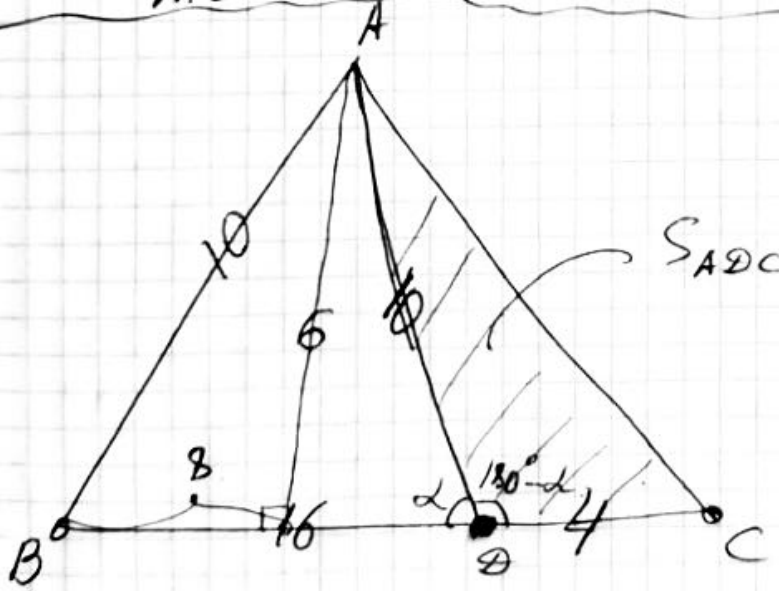
(21)



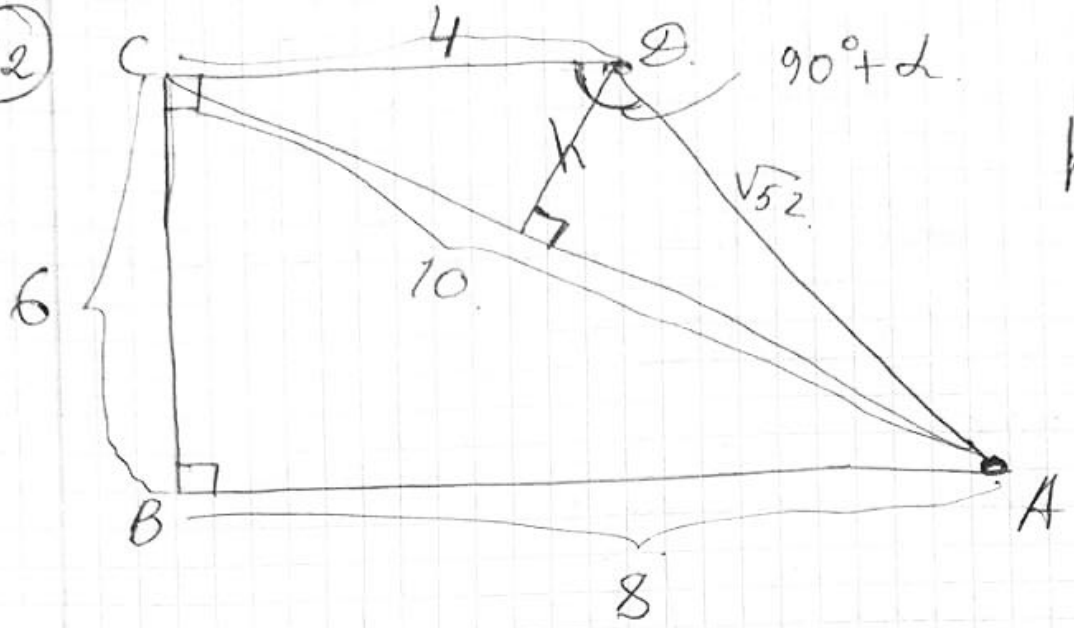
$S_{ABD} = \frac{1}{2} \cdot 16 \cdot 6 = 8 \cdot 6 = 48$

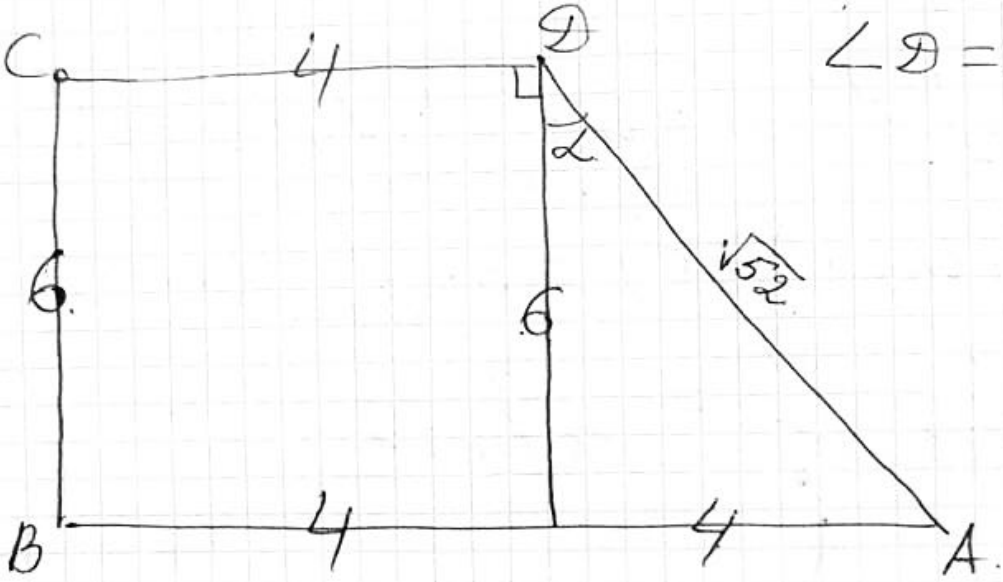
$S_{ABD} = \frac{1}{2} \cdot 16 \cdot 10 \cdot \sin\alpha = 48$ (A)

$S_{ADC} = \frac{1}{2} \cdot 10 \cdot 4 \cdot \sin(180° - \alpha) = 20 \cdot \sin\alpha = X$

$\frac{S_{ABD}}{S_{ADC}} = \frac{\frac{1}{2} \cdot 16 \cdot 10 \sin\alpha}{\frac{1}{2} \cdot 10 \cdot 4 \sin\alpha} = \frac{48}{x} \Rightarrow \frac{4}{1} = \frac{48}{x} \Rightarrow x = 12$

(22)





$\cos\alpha = \frac{6}{\sqrt{52}}$

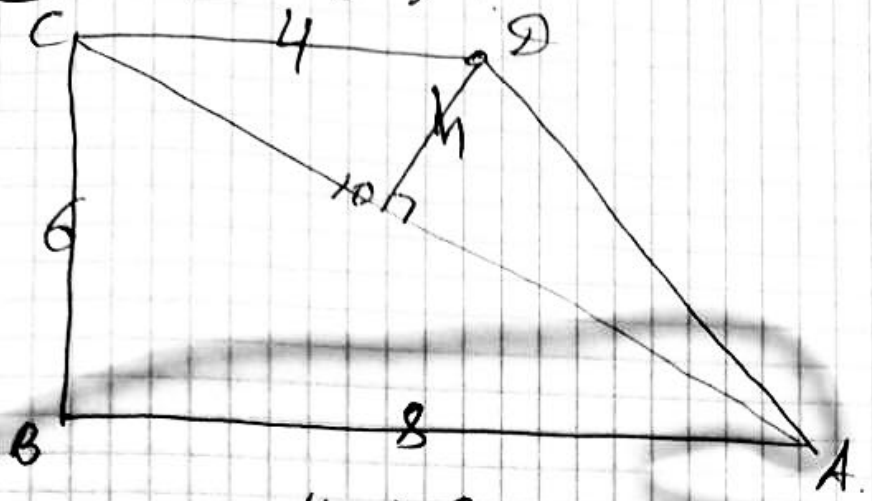
$S_{ACD} = \frac{1}{2} \cdot 4 \cdot \sqrt{52} \cdot \sin(90°+\alpha) =$

$= \frac{1}{2} \cdot 4 \cdot \sqrt{52} \cdot \cos\alpha = 2\sqrt{52} \cdot \frac{6}{\sqrt{52}} = 12$

$S_{ACD} = \frac{1}{2} AC \cdot h \Rightarrow 12 = \frac{1}{2} \cdot 10 \cdot h \Rightarrow h = 2{,}4$

(C)

(22) $\overline{11}$ - yeq ∧



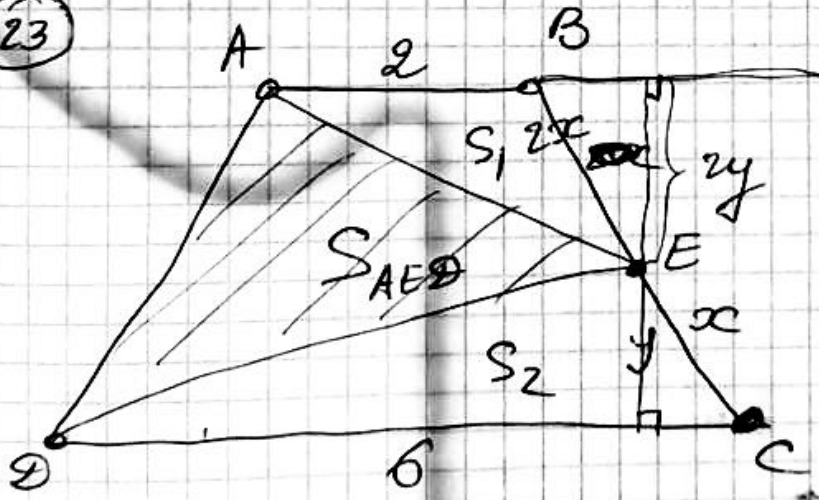
$$S_{TP} = \frac{4+8}{2} \cdot 6 = 36$$

$$S_{\Delta BCA} = \frac{1}{2} \cdot 6 \cdot 8 = 24$$

$$S_{ACD} = S_{TP} - S_{\Delta BCA} = 36 - 24 = 12$$ (C)

$$S_{ACD} = \frac{1}{2} \cdot 10 \cdot h \Rightarrow 12 = \frac{1}{2} \cdot 10 \cdot h \Rightarrow h = 2,4$$

(23)



$h = 3y$.

$$S_{TP} = \frac{2+6}{2} \cdot h = \frac{2+6}{2} \cdot 3y = 12y = 48 \Rightarrow y = 4.$$

$$S_{AED} = S_{TP} - (S_1 + S_2) = 48 - \left(\frac{1}{2} \cdot 2 \cdot 2y + \frac{1}{2} \cdot 6 \cdot 4\right) =$$

$$= 48 - (2y + 3y) = 48 - 5y = 48 - 5 \cdot 4 = 28$$

(D)

2018 вариант №1

1. $\overline{abc} + \overline{bca} + \overline{cab} = 777 \quad a+b+c = ?$

$100a+10b+c+100b+10c+a+100c+10a+b=777$

$111(a+b+c)=777$

$a+b+c=7$ (A)

2. $4,8 = x + \frac{y}{5}$

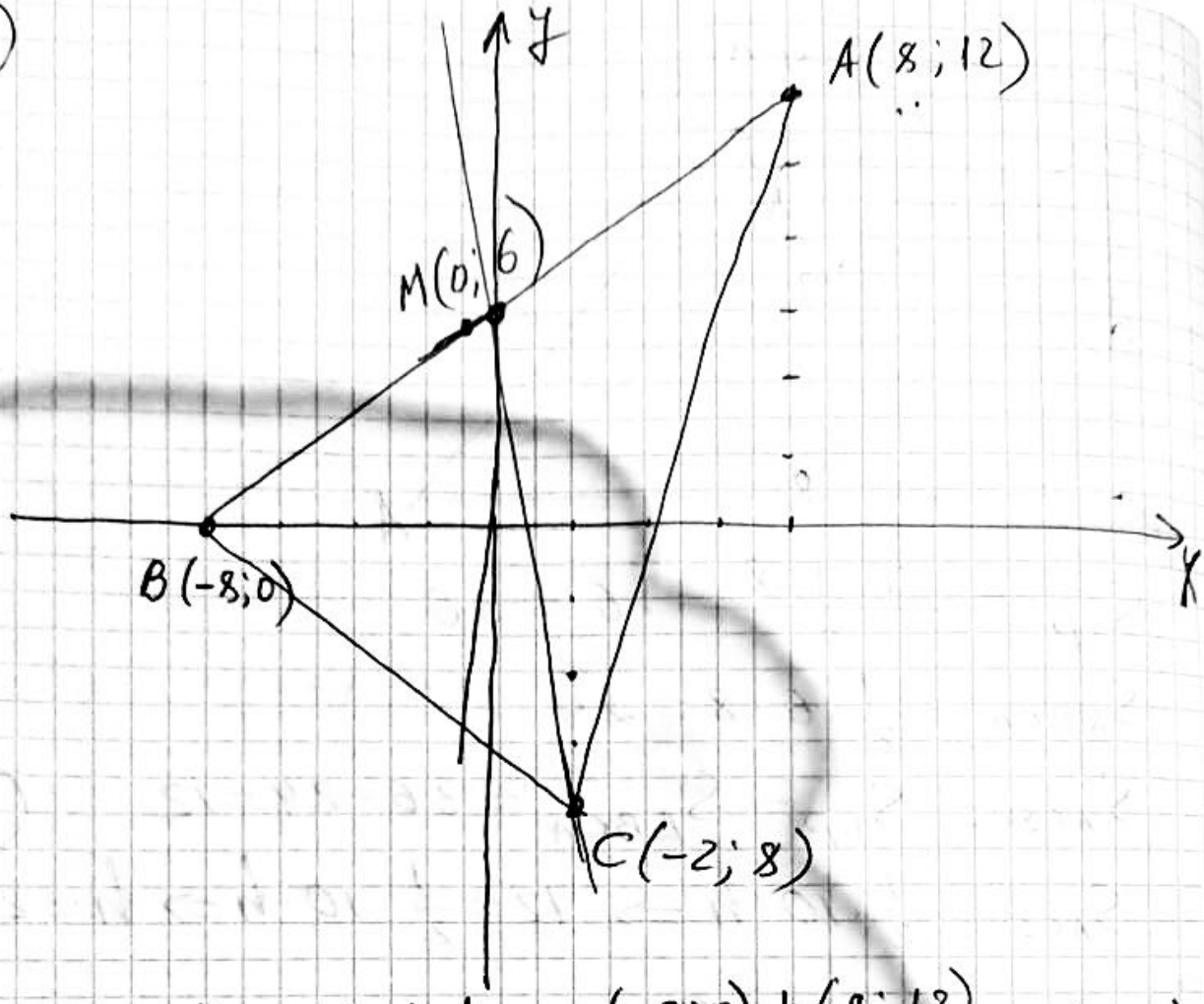
$4+0,8 = 4+\frac{8}{10} = 4+\frac{y}{5} \quad y=4;\ x=4$

$3+1,8 = 3+\frac{18}{10} = 3+\frac{9}{5} \Rightarrow y=9 \quad x=3$

шарт: $x, y < 5 \quad x, y \in N$

Жавоб: $y=4$ (C)

(24)



$$M(x;y) = \frac{B+A}{2} = \frac{(-8;0)+(8;12)}{2} = (0;6)$$

$C(-2;8)$ ва $M(0;6)$ дан ўтувчи тўғри чизиқ тенгламаси:

$y = kx + b$

$$\begin{cases} 8 = k\cdot(-2) + b \\ 6 = k\cdot 0 + b \end{cases} \Rightarrow \begin{cases} 8 = -2k + 6 \Rightarrow k = -1 \\ b = 6 \end{cases}$$

$y = kx + b \Rightarrow y = -x + 6 \Rightarrow x + y = 6$ (C)

(25) $A = \{x : |x-2| < 3,\ x \in N\}$

$|x-2| < 3 \Rightarrow -3 < x-2 < 3 \ /+2 \Rightarrow$

$\Rightarrow -1 < x < 5 \Rightarrow x = 1; 2; 3; 4$

элементлар сони 4 та

(B)