

 **Заметки**



31 мая 2018 г., 22:54

**DTM tomonidan taqdim qilingan
namunaviy test (axborotnoma)ni
3-variant yechimlari : Misollar
Usmonov.M tomonidan yechilgan:
Loyiha muallifi :
@PulatovDilmurodHalimbayvich
Rasmiy kanalimiz @axborotnoma
Matematikan yordam guruhi :
@axborotnomaguruhi
Takliflar uchun
@axborotnoma_bot
Reklama xizmatimiz mavjud
@axborotnoma_reklama**

Арбороткома 2018 3-сони.

① $(x+2)^2 - x^2 = 116$ $x = ?$

$$x^2 + 4x + 4 - x^2 = 116$$

$$4x + 4 = 116 \quad | :4$$

$$x + 1 = 29 \Rightarrow x = 28$$

С

②
$$\begin{cases} x+y=242 \\ \frac{x}{y} = 4 + \frac{22}{y} \end{cases} \Rightarrow \begin{cases} x+y=242 \\ x=4y+22 \end{cases} \Rightarrow 4y+22+y=242$$

$$\Rightarrow 5y = 220 \Rightarrow y = 44$$

В

③
$$\begin{aligned} & 2016 \cdot (2017 \cdot 2018 + 1) = \\ & = (2017 - 1) (2017(2017 + 1) + 1) = |2017 = t| = \\ & = (t - 1) (t(t + 1) + 1) = (t - 1) (t^2 + t + 1) = \\ & = t^3 - 1 = 2017^3 - 1 \end{aligned}$$

Д

④ $4a = 5b \Rightarrow \frac{a}{b} = \frac{5}{4} = \frac{5 \cdot 9}{4 \cdot 9} = \frac{45}{36}$

$\text{ЭКЧБ}(a; b) = \text{ЭКЧБ}(45; 36) = 9$

масола шарти.

$$a = 45; \quad b = 36$$

$$a + b = 45 + 36 = 81$$

А

⑤
$$\begin{array}{l} v_1 = 2v \\ v_2 = v \\ t = 12 \text{ соф.} \end{array}$$

$$V = (v_1 + v_2) \cdot t$$

$$V = (2v + v) \cdot 12 \Rightarrow v = \frac{V}{36}$$

$$v_1 = \frac{V}{3} \quad t_1 = ? \quad | \quad V_1 = v_1 \cdot t_1 \Rightarrow \frac{V}{3} = 2 \cdot v \cdot t_1 \Rightarrow$$

$$\Rightarrow \frac{V}{3} = 2 \cdot \frac{V}{36} \cdot t_1 \Rightarrow \frac{V}{3} = \frac{V}{18} \cdot t_1 \Rightarrow t_1 = 6 \text{ соф}$$

С

⑥ $1, 8, 27, 64, 125, \dots$
 $1^3, 2^3, 3^3, 4^3, 5^3, \dots, n^3$

$a_n = n^3 \Rightarrow n = 10 \Rightarrow a_{10} = 10^3 = 1000$ (D)

⑦ $1 \cdot 4 + 2 \cdot 7 + 3 \cdot 10 + \dots + 10 \cdot 31 =$
 $= 1 \cdot (3+1) + 2 \cdot (6+1) + 3 \cdot (9+1) + \dots + 10(30+1) =$
 $= 3 \cdot 1 + 1 + 6 \cdot 2 + 2 + 9 \cdot 3 + 3 + \dots + 30 \cdot 10 + 10 =$
 $= (3 \cdot 1 + 6 \cdot 2 + 9 \cdot 3 + \dots + 30 \cdot 10) + (1 + 2 + 3 + \dots + 10) =$
 $= 3(1 + 2 \cdot 2 + 3 \cdot 3 + \dots + 10 \cdot 10) + \frac{1+10}{2} \cdot 10 =$
 $= 3 \cdot (1 + 4 + 9 + 16 + 25 + 36 + 49 + 64 + 81 + 100) + 55 =$
 $= 1210$

\rightarrow формула: $1^2 + 2^2 + 3^2 + \dots + n^2 = \frac{n(n+1)(2n+1)}{6}$

⑧ $\operatorname{tg} 20^\circ + 4 \sin 20^\circ = \frac{\sin 20^\circ}{\cos 20^\circ} + 4 \sin 20^\circ =$
 $= \frac{\sin 20^\circ + 4 \sin 20^\circ \cos 20^\circ}{\cos 20^\circ} = \frac{\sin 20^\circ + 2 \sin 40^\circ}{\cos 20^\circ} =$
 $= \frac{\sin 20^\circ + \sin 40^\circ + \sin 40^\circ}{\cos 20^\circ} = \frac{2 \sin 30^\circ \cos 10^\circ + \sin 40^\circ}{\cos 20^\circ} =$
 $= \frac{\cos 10^\circ + \sin 40^\circ}{\cos 20^\circ} = \frac{\cos(90^\circ - 80^\circ) + \sin 40^\circ}{\cos 20^\circ} = \frac{\sin 80^\circ + \sin 40^\circ}{\cos 20^\circ} =$
 $= \frac{2 \sin \frac{80^\circ + 40^\circ}{2} \cos \frac{80^\circ - 40^\circ}{2}}{\cos 20^\circ} = \sqrt{3}$ (C)

⑨ $\operatorname{ctg} 15^\circ + \operatorname{ctg} 30^\circ + \operatorname{ctg} 45^\circ + \dots + \operatorname{ctg} 135^\circ + \operatorname{ctg} 150^\circ + \operatorname{ctg} 165^\circ =$
 $= \operatorname{ctg} 15^\circ + \operatorname{ctg} 30^\circ + \operatorname{ctg} 45^\circ + \dots + \operatorname{ctg}(180^\circ - 45^\circ) + \operatorname{ctg}(180^\circ - 30^\circ) +$
 $+ \operatorname{ctg}(180^\circ - 15^\circ) =$
 $= \operatorname{ctg} 15^\circ + \operatorname{ctg} 30^\circ + \operatorname{ctg} 45^\circ + \dots + \operatorname{ctg} 90^\circ + \dots + \operatorname{ctg} 45^\circ - \operatorname{ctg} 30^\circ - \operatorname{ctg} 15^\circ =$
 $= 0$ (A)

$$\textcircled{10} \quad \frac{a+b}{12a-b} = \frac{21}{57} = \frac{7 \cdot 3}{19 \cdot 3} = \frac{7}{19}$$

$$+ \frac{a+b}{12a-b} = \frac{7}{19}$$

$$13a = 26 \Rightarrow a = 2; \quad b = 5 \quad \textcircled{A}$$

$$\textcircled{11} \quad a < 0, \quad b < 0; \quad c > 0$$

$$\sqrt{b^2} + |b-c| - |c-a| + b = |b| - (b-c) - (c-a) + b = -b - b + c - c + a + b = a - b \quad \textcircled{D}$$

Узок: $b < 0$ бунца $|b| = -b$

$b < 0, c > 0$ бунца $b-c < 0$ бунца
учун $|b-c| = -(b-c)$

$c > 0, a < 0$ бунца $c-a > 0$ бунца
учун $|c-a| = +(c-a)$

$$\textcircled{12} \quad 25^x = 12 \Rightarrow (5^x)^2 = 12 \Rightarrow 5^x = \sqrt{12} = 2\sqrt{3} \quad \textcircled{D}$$

$$\textcircled{13} \quad \underbrace{\sqrt{3x+2y-13}}_0 + \underbrace{\sqrt{4x-y+10}}_0 = 0$$

$$\begin{cases} 3x+2y=13 \\ 4x-y=10 \end{cases} \cdot 2 \Rightarrow \begin{cases} 3x+2y=13 \\ 8x-2y=20 \end{cases} +$$

$$11x = 33 \Rightarrow x = 3$$

$$3 \cdot 3 + 2y = 13 \Rightarrow y = 2$$

$$x \cdot y = 3 \cdot 2 = 6$$

14) $x\sqrt{x} - 8\sqrt{x} = 7$

Алгоритм 2018
ЗСОИ

$x\sqrt{x} + 1 - 8\sqrt{x} - 8 = 0 \Rightarrow \sqrt{x} = t$

$t^3 + 1 - 8(t+1) = 0$

$(t+1)(t^2 - t + 1 - 8) = 0$

$t+1=0 \Rightarrow t=-1 \Rightarrow \sqrt{x}=-1 \quad \emptyset$

$t^2 - t - 7 = 0 \Rightarrow t^2 - t = 7 \Rightarrow (\sqrt{x})^2 - \sqrt{x} = 7 \Rightarrow$
 $\Rightarrow x - \sqrt{x} = 7.$

С

15) $x + (x+2) + (x+4) + (x+6) > 49, \quad x \in \mathbb{N} \quad x - \text{тоқ соң}$

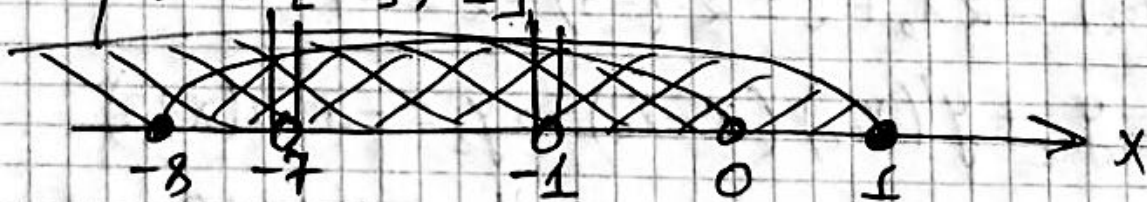
$4x + 12 > 49 \Rightarrow x > 9,25$

$x_{\min} = 11$

С

16) $x^7 \cdot |x^2 + 8x + 7| < 0 \Rightarrow \begin{cases} x^7 \cdot |(x+7)(x+1)| < 0 \\ x \in [-8; 1] \end{cases} \Rightarrow$

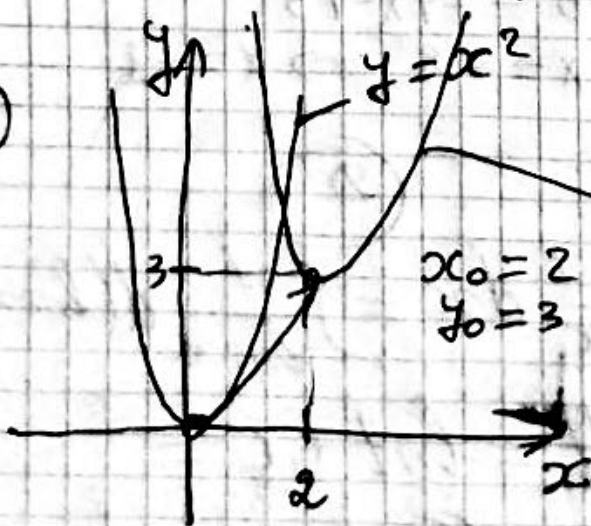
$\Rightarrow \begin{cases} x \neq -7; x \neq -1; x < 0 \\ x \in [-8; 1] \end{cases}$



$x \in \mathbb{Z} \Rightarrow x = -8; -6; -5; -4; -3; -2;$

бта А

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$x_0 = 2$
 $y_0 = 3$

$y_1 = (x - x_0)^2 + y_0$

$y_1 = (x - 2)^2 + 3 = x^2 - 4x + 7$

А

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$$y = x^2 - |2x - 4|$$

$x = 3$ бўлса, $|2x - 4| = (2x - 4)$

$x_0 = 3$ учун уринма тенгламаш:

$$y = x^2 - (2x - 4) \Rightarrow y = x^2 - 2x + 4$$

$$y_{01} = 3^2 - 2 \cdot 3 + 4 = 7$$

$$y'(x_0) = 2x_0 - 2 = 2 \cdot 3 - 2 = 4$$

$$y_1 = y_{01} + y'(x_0)(x - x_0) \Rightarrow y_1 = 7 + 4(x - 3)$$

$$y_1 = 4x - 5$$

$x = -3$ бўлса, $|2x - 4| = -(2x - 4)$

$x_0 = -3$ учун уринма тенгламаш:

$$y = x^2 + (2x - 4) \Rightarrow y = x^2 + 2x - 4$$

$$y_{02} = (-3)^2 + 2 \cdot (-3) - 4 = 9 - 6 - 4 = -1$$

$$y'(x_0) = 2x_0 + 2 = 2 \cdot (-3) + 2 = -4$$

$$y_2 = y_{02} + y'(x_0)(x - x_0) \Rightarrow y_2 = -1 - 4(x + 3)$$

$$y_2 = -4x - 13$$

$$\begin{cases} y = 4x - 5 \\ y = -4x - 13 \end{cases} \Rightarrow \begin{cases} 4x - 5 = -4x - 13 \\ 8x = -8 \end{cases} \Rightarrow x = -1$$

$$y = 4 \cdot (-1) - 5 = -9$$

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$$\begin{aligned} \int \frac{dx}{x \ln 2x} &= \int \frac{1}{\ln 2x} \cdot \frac{1}{x} dx = \int \frac{1}{\ln 2x} d(\ln 2x) \\ &= \int \frac{1}{t} dt = \ln |t| + c = \ln |\ln 2x| + c \end{aligned}$$

(B)

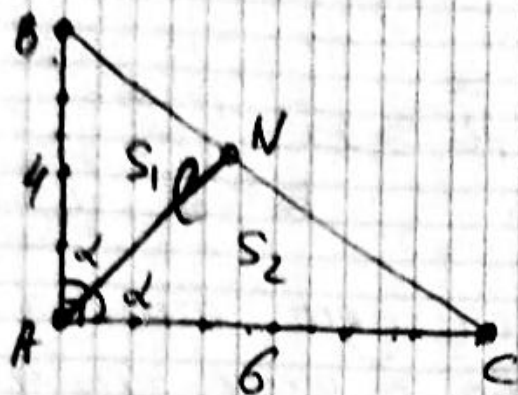
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$$S_{\text{circle}} = 15 \quad \alpha = 72^\circ \quad R = ?$$

$$S_{\text{circle}} = \frac{R^2 \alpha}{360^\circ} \Rightarrow R = \sqrt{\frac{S \cdot 360^\circ}{\alpha}}$$

$$= \sqrt{\frac{15 \cdot 360^\circ}{72^\circ \cdot \pi}} = \sqrt{\frac{75}{\pi}} \quad \text{(A)}$$

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$$S = S_1 + S_2 = \frac{1}{2} \cdot 4 \cdot 6 = 12$$

$$\begin{cases} S_1 = \frac{1}{2} \cdot 4 \cdot l \sin \alpha \\ S_2 = \frac{1}{2} \cdot 6 \cdot l \sin \alpha \end{cases} \Rightarrow \frac{S_1}{S_2} = \frac{2}{3}$$

$$S_{ABN} = S_1 = ?$$

$$\begin{cases} S_1 + S_2 = 12 \\ \frac{S_1}{S_2} = \frac{2}{3} \Rightarrow S_2 = 1.5 S_1 \end{cases} \quad \begin{cases} 1.5 S_1 + S_1 = 12 \\ S_1 = 4.8 \end{cases} \quad \text{(B)}$$

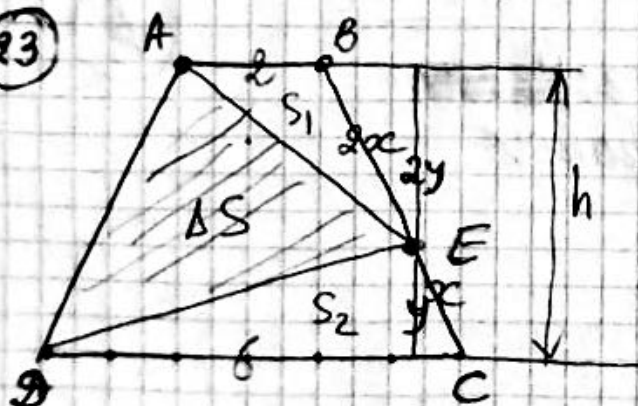
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$$z = \frac{a+b-c}{2}; \quad R = \frac{c}{2}; \quad c = 6; \quad R+z = 4$$

$$R+z = \frac{c}{2} + \frac{a+b-c}{2} = \frac{a+b}{2} = 4 \Rightarrow a+b = 8$$

$$P = a+b+c = 8+6 = 14 \quad \text{(D)}$$

23



$$S_{TP} = 36$$

$$S_{TP} = \frac{2+6}{2} \cdot h = \frac{2+6}{2} \cdot 3y$$

$$S_{TP} = 12y = 36$$

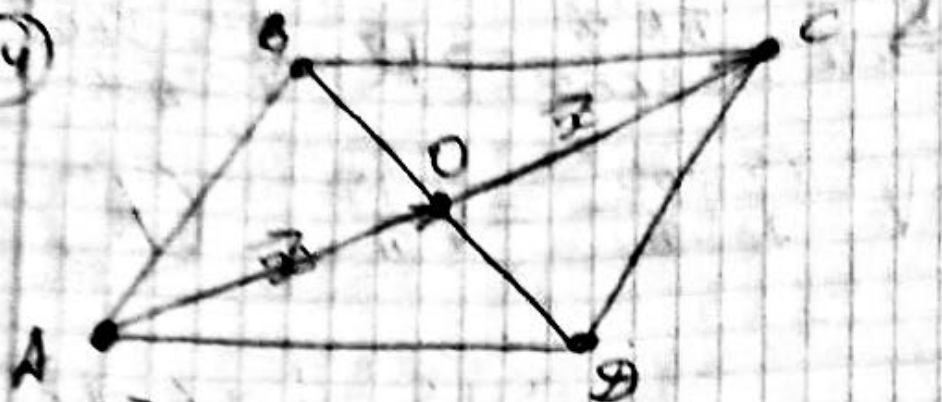
$$y = 3$$

$$S_1 = \frac{1}{2} \cdot 2 \cdot 2y = 2y = 2 \cdot 3 = 6$$

$$S_2 = \frac{1}{2} \cdot 6 \cdot y = 3y = 3 \cdot 3 = 9$$

$$\Delta S = S_{TP} - (S_1 + S_2) = 36 - (6 + 9) = 21 \quad \text{(B)}$$

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$$\begin{cases} \vec{AC} = 2\vec{x} \\ \vec{AO} = \vec{x} \end{cases} \quad \vec{AC} = k \cdot \vec{AO} \Rightarrow 2\vec{x} = k \cdot \vec{x} \\ k = 2 \quad \text{C}$$

25

$a - b = |x| + 3$ теңгелек өшінгі еге бұйса, а ва в үшін түрлі мүмкіндіктерді кұрсатқыз.

$$a - b = |x| + 3 \Rightarrow a - b - 3 = |x|$$

$$|x| \geq 0 \text{ эканьдан: } a - b - 3 \geq 0 \Rightarrow$$

$$\Rightarrow \underline{a \geq b + 3} \text{ мүмкіндіктерін}$$

түрлі жавоб берилмаган.

Шарты равшинда А жавобки олши мүмкін:

$$\begin{cases} a \geq b + 3 \\ \underline{a > b} \end{cases}$$

A