31 мая 2018 г., 23:03

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Rasmiy kanalimiz @axborotnoma
Matematikan yordam guruhi :
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Reklama xizmatimiz mavjud
@axborotnoma_reklama

2018 Ихбоқтона Вариант №4

(1) $\frac{a}{36} = n + \frac{n^2}{36}$

$\Downarrow$

$a = 36n + n^2$.

$\begin{cases} n \in N \\ a \in N \\ \frac{n^2}{36} < 1 \end{cases} \Rightarrow n_{max} = 5$

$a_{max} = 36 \cdot 5 + 25 = 205$ (C)

(2) $x = 3a + 2 = 5b + 4 = 7c + 6$

$x \in N$, $x \in [100; 999]$, $a, b, c \in N$

$x_{max} = ?$

$3a + 2 = 7c + 6 \Rightarrow c = \frac{3a - 4}{7}$

$c \in N$; $a \in N$ бўлса, $k \in N$

$a = 6, 13, 20, 27, \ldots 7n - 1$ бўлади.

$3a + 2 = 5b + 4 \Rightarrow b = \frac{3a - 2}{5}$

$b \in N$, $a \in N$ бўлса,

$a = 4, 9, 14, 19 \ldots 5k - 1$, $k \in N$

$b, c \in N$ бўладиган a нинг жиймат-лари $a = 35m - 1$, $m \in N$

$x = 3a + 2 = 3 \cdot (35m - 1) + 2 = 105m - 1$

$100 \le x \le 999 \Rightarrow 100 \le 105m - 1 \le 999 \Rightarrow$

$\Rightarrow 101 \le 105m \le 999 \Rightarrow m_{max} = 9$

$x_{max} = 105 m_{max} - 1 = 105 \cdot 9 - 1 = 944$ (B)

(3) $= \left(\frac{(\sqrt{6}+\sqrt{5})(\sqrt{6}-\sqrt{5})}{(\sqrt{2}+1)(\sqrt{2}-1)} : \left(\frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} - \frac{\sqrt{3}}{9} + \frac{1}{\sqrt{27}} \cdot \frac{\sqrt{3}}{\sqrt{3}}\right)\right) =$

$= 1 : \left(\frac{\sqrt{3}}{3} - \frac{\sqrt{3}}{9} + \frac{\sqrt{3}}{9}\right) = 1 : \frac{\sqrt{3}}{3} = \frac{3}{\sqrt{3}} = \sqrt{3}$ (C)

(4) $27{,}3 \cdot 10^{n} = 0{,}\underbrace{0000}_{6\text{ то}}27{,}3 = 27{,}3 \cdot 10^{-6}$

$n = -6$ (A)

(5) $\begin{cases} v_1 \cdot 1 + v_2 \cdot 2 = \frac{3}{8}V \\ v_1 \cdot 3 + v_2 \cdot 2 = \frac{5}{8}V \end{cases}$ — $\boxed{\frac{V}{v_1} = ?}$

$2v_1 = \frac{2V}{8} = \frac{V}{4} \Rightarrow \frac{V}{v} = 8$ (C)

(6) $(2^2+6^2+10^2+14^2+18^2) - (1^2+5^2+9^2+13^2+17^2) =$

$= 2^2-1^2+6^2-5^2+10^2-9^2+14^2-13^2+18^2-17^2 =$

$= (2-1)(2+1)+(6-5)(6+5)+(10-9)(10+9)+$

$+(14-13)\cdot(14+13)+(18-17)(18+17) =$

$= 3+11+19+27+35 = 30+30+35 = 95$ (B)

(7) $1\cdot 4 + 2\cdot 7 + 3\cdot 10 + \ldots + 8\cdot 25 =$

$= 1\cdot(3+1)+2\cdot(6+1)+3\cdot(9+1)+\ldots+8(24+1) =$

$= 3\cdot 1+1+6\cdot 2+2+9\cdot 3+3+\ldots 24\cdot 8+8 =$

$= (3\cdot 1+6\cdot 2+9\cdot 3+\ldots 24\cdot 8)+(1+2+3+\ldots 8) =$

$= 3(1^2+2^2+3^2+4^2+5^2+6^2+7^2+8^2)+\frac{1+8}{2}\cdot 8 =$

$= 3\cdot(1+4+9+16+25+36+49+64)+36 =$ (C)

(8) $\arcsin x \in \left[-\frac{\pi}{2}; \frac{\pi}{2}\right]$; $\sin(\pi-\alpha)=\sin\alpha$.

$\arcsin(\sin 3) = \arcsin(\sin(\pi-(\pi-3))) =$

$= \arcsin(\sin(\pi-3)) = \pi-3$; (B)

(9) $\cos 1^\circ + \cos 2^\circ + \cos 3^\circ + \ldots + \cos 90^\circ + \ldots + \cos 177^\circ +$

$+ \cos 178^\circ + \cos 179^\circ = \cos 1^\circ + \cos 2^\circ + \cos 3^\circ + \ldots + \cos 90^\circ + \ldots$

$\ldots + \cos(180^\circ - 3^\circ) + \cos(180^\circ - 2^\circ) + \cos(180^\circ - 1^\circ) =$

$= \cos 1^\circ + \cos 2^\circ + \cos 3^\circ + \ldots + 0 + \ldots - \cos 3^\circ - \cos 2^\circ - \cos 1^\circ =$

$= 0$ (C)

(10) $a \cdot b \cdot c = 4$

$bc = \frac{4}{a}$

$ac = \frac{4}{b}$

$ab = \frac{4}{c}$.

$\left(\frac{1}{a} - bc\right) \cdot \left(\frac{2}{b} - ac\right) \cdot \left(\frac{3}{c} - ab\right) =$

$= \left(\frac{1}{a} - \frac{4}{a}\right) \cdot \left(\frac{2}{b} - \frac{4}{b}\right) \cdot \left(\frac{3}{c} - \frac{4}{c}\right) =$

$= \left(-\frac{3}{a}\right) \cdot \left(-\frac{2}{b}\right) \cdot \left(-\frac{1}{c}\right) = -\frac{6}{abc} =$

$= -\frac{6}{4} = -\frac{3}{2}$ (B)

(11) $\frac{1}{a} > \frac{1}{b} > \frac{1}{c}$; $a<0, b<0, c<0$, $a,b,c \in \mathbb{Z}$ бўлса $c>b>a$ бўлади.

Масалан: $c=-2$; $b=-4$; $a=-5$

$\frac{1}{-5} > \frac{1}{-4} > \frac{1}{-2} \Rightarrow -0,2 > -0,25 > -0,5$

тўғри

$|a+b|-|b-c|+|a-c| = -(a+b)+(b-c)-(a-c) =$

$= -a-b+b-c-a+c = -2a$

(A)

$0>b>a$ бўлса, $|a+b| = -(a+b)$

$0>c>b$ бўлса, $|b-c| = -(b-c)$

$0>c>a$ бўлса, $|a-c| = -(a-c)$

(12) $x^2-5x+2=0 \Rightarrow x^2+2=5x$;

$x^2+\frac{4}{x^2} = \left(x+\frac{2}{x}\right)^2-4 = \left(\frac{x^2+2}{x}\right)^2-4 =$

$= \left(\frac{5x}{x}\right)^2-4 = 21$

(C)

(13) $(x) = \sqrt{42-\sqrt{42-\sqrt{42-\ldots}}}$

$x^2 = 42-\sqrt{42-\sqrt{42-\sqrt{42-\ldots}}}$, $x>0$

$x^2 = 42-x$

$x^2+x-42=0 \Rightarrow (x+7)(x-6)=0$

$x_1=-7 \notin$ $x_2=6$

$y = \sqrt{x+\sqrt{x+\sqrt{x+\ldots}}}$

$(y) = \sqrt{6+\sqrt{6+\sqrt{6+\ldots}}}$

$y^2 = 6+\sqrt{6+\sqrt{6+\ldots}}$

$y^2 = 6+y \Rightarrow y^2-y-6=0$

$(y-3)(y+2)=0$ $\quad y_1=3;\ y_2=-2\not\in$

$(z)^2=(\sqrt{y\cdot\sqrt{y\cdot\sqrt{y\cdot\ldots}}})^2$

$z^2=y\cdot\sqrt{y\cdot\sqrt{y\cdot\ldots}}$

$z^2=y\cdot z \Rightarrow z=y=3$

$x+y+z=6+3+3=12.$ (D)

(14) $x\sqrt{x}-9\sqrt{x}=8;\quad x-\sqrt{x}=?$

$\sqrt{x}=t \Rightarrow t^3-9t=8;\quad t^2-t=?$

$t^3-9t=8 \Rightarrow t^3+t-9t-9=0 \Rightarrow$

$\Rightarrow (t+1)(t^2-t+1)-9(t+1)=0$

$(t+1)\cdot[t^2-t-8]=0$

$t_1=-1 \qquad t^2-t=8$ (D)

$\not\in$

(15) $x+3(x+2)<70,\quad x=2n,\ n\in\mathbb{N}$

$x_{max}=?$

$4x+6<70$

$x<16 \Rightarrow x_{max}=14$ (C)

(16) $f(x)=\begin{cases}4x+1, & x<0\\ -x^3+5, & x\geq 0\end{cases}$

$f(2) \Rightarrow |x>0| \Rightarrow -x^3+5=-2^3+5=-3$

$f(f(2))=f(-3) \Rightarrow x<0 \Rightarrow f(-3)=4\cdot(-3)+1=-11$

(C)

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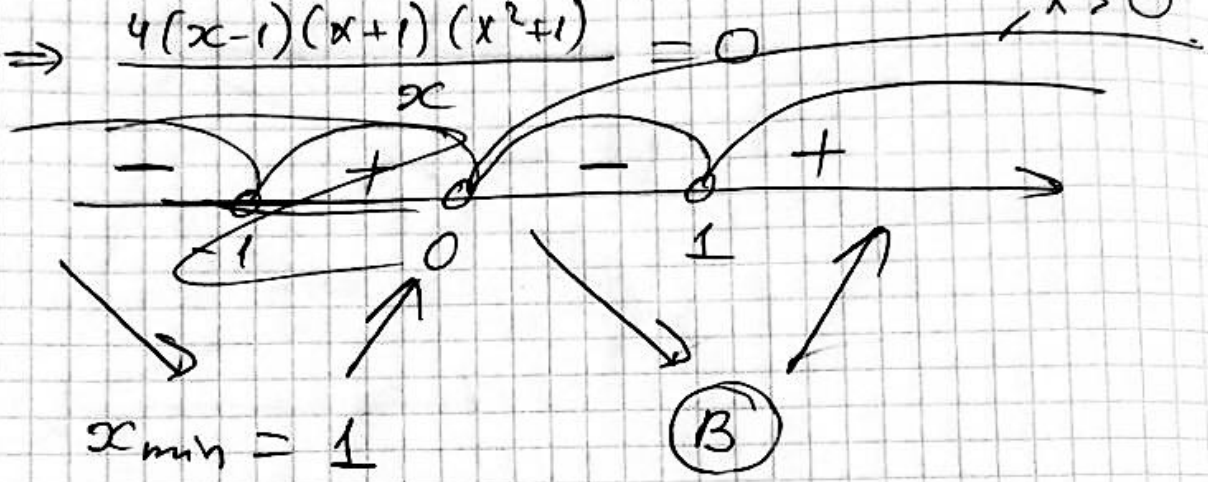
(17) $y = x^4 - 4\ln x$ $x_{min} = ?$ $x > 0$

$y'(x) = (x^4 - 4\ln x)' = 4x^3 - \frac{4}{x} = 0$

$4x^3 - \frac{4}{x} = 0 \Rightarrow \frac{4(x^4-1)}{x} = 0 \Rightarrow$

$\Rightarrow \frac{4(x-1)(x+1)(x^2+1)}{x} = 0$ $x > 0$



$x_{min} = 1$ (B)

(18) $y = x^2 - |2x-4|$

$x = 3 \Rightarrow |2x-4| = +(2x-4)$

$x_0 = 3$ учун уринма тенгламаси:

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

$y_0 = 3^2 - 2\cdot 3 + 4 = 7$

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

$y = y_0 + y'(x_0)(x - x_0) \Rightarrow y = 7 + 4(x-3)$

$y_1 = 4x - 5$

$x = -3 \Rightarrow |2x-4| = -(2x-4)$

$x_0 = -3$ учун уринма тенгламаси:

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

$y_0 = (-3)^2 + 2(-3) - 4 = -1$

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

$y = y_0 + y'(x_0)(x - x_0)$

$y = -1 + (-4)(x+3) \Rightarrow y_2 = -4x - 13$

$\begin{cases} y_1 = 4x - 5 \\ y_2 = -4x - 13 \end{cases} \Rightarrow 4x - 5 = -4x - 13$

$8x = -8 \Rightarrow x = -1$

(D)

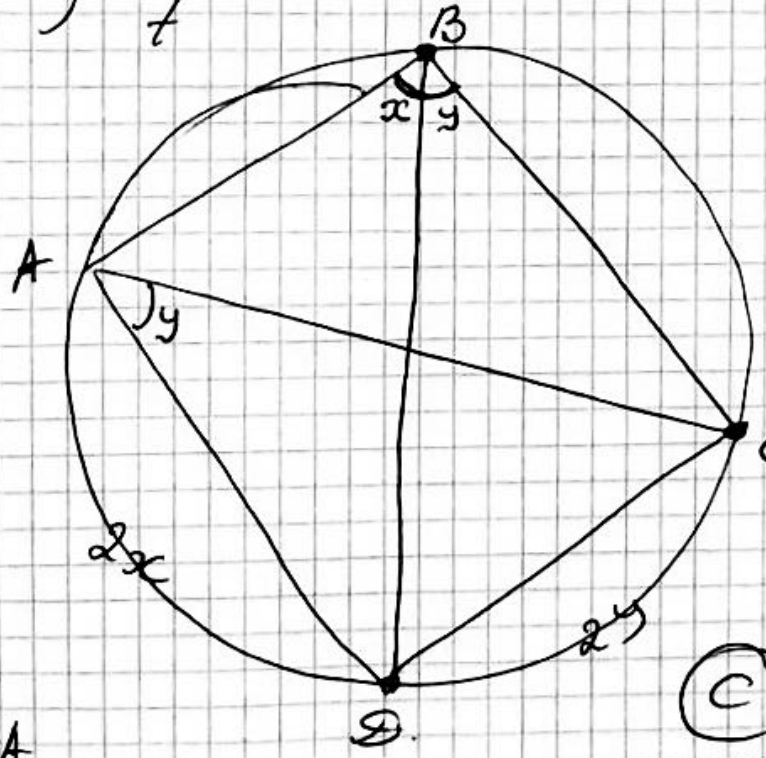
(19) $\int \frac{2\,dx}{x \ln^2 x} = \int \frac{2}{\ln^2 x} \cdot \frac{1}{x}\,dx =$

$= \int \frac{2}{\ln^2 x}\, d(\ln x) \Rightarrow \ln x = t \Rightarrow$

$\Rightarrow \int \frac{2}{t}\,dt = 2\ln t = 2\ln(\ln x) + C$

(D)

(20)



$\angle ABC = 108°$

$x + y = 108°$

$\angle CAD = 35°$

$y = 35°$

$\angle ABD = x = ?$

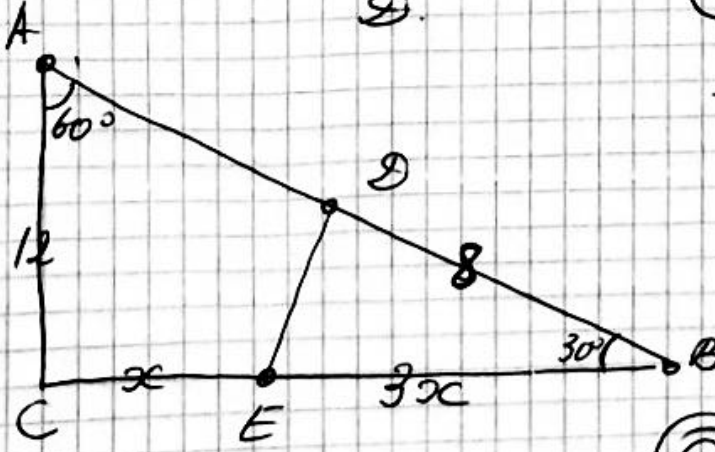
$x + y = 108°$

$x + 35° = 108°$

$x = 70°$

(C)

(21)



$\frac{BC}{AC} = \frac{4x}{12} = \operatorname{tg} 60°$

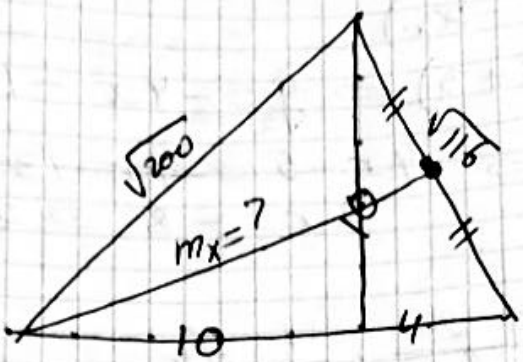
$\frac{x}{3} = \sqrt{3} \Rightarrow x = 3\sqrt{3}$

$S_{BDE} = \frac{1}{2} \cdot 8 \cdot 3x \cdot \sin 30°$

$S_{BDE} = 6x$

(C) $S_{BDE} = 18\sqrt{3}$

(22)

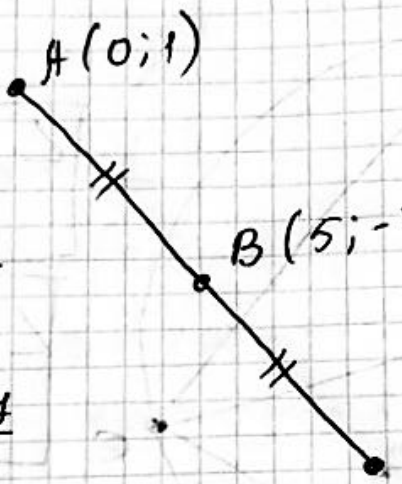


$$m_a = \frac{1}{2}\sqrt{2(b^2+c^2)-a^2}$$

$$m_x = \frac{1}{2}\sqrt{2\left((\sqrt{200})^2+(14)^2\right)-(\sqrt{116})^2} = 26\frac{1}{2}$$

$$m_x = 13$$

(23)



$$B = \frac{A+C}{2}$$

$$(5;-3) = \frac{(0;1)+(x;y)}{2}$$

$$5 = \frac{0+x}{2}$$

$$x = 10$$

$$-3 = \frac{1+y}{2}$$

$$y = -7$$

$$x+y = 10+(-7) = 3$$ (C)

(24) A) $A = \{x : x^2 \le 0, x \in R\} \Rightarrow x = 0$

B) $A = \{x : 3x+5 \ge 0, x \in R\} \Rightarrow x \ge -\frac{5}{3}$

C) $A = \{x : x^2 - x < 0, x \in R\} \Rightarrow x^2 - x < 0 \Rightarrow$

$\Rightarrow x \in (0;1)$

D) $A = \{x : |2x-3| = -4, x \in R\} \Rightarrow$

$\Rightarrow |2x-3| = -4 \Rightarrow \varnothing$ (D)

(25) $a-b = \frac{1}{|3x|} > 0$ $a-b > 0$ $a > b$ (C)