

( 11 )

«

»-2012

1.

1500 грн. 3 50 ,  
 60 грн. ,  
 100% – 1500 грн, x% – 60 грн.

2.

:  $2x + \frac{\pi}{3} = (-1)^k \frac{\pi}{6} + \pi k, k \in \mathbb{Z}$ .  
 , :  $x = (-1)^k \frac{\pi}{12} - \frac{\pi}{6} + \frac{\pi k}{2}, k \in \mathbb{Z}$ .  
 ( ) (0, -1, 1, -2, 2...),  
 :  $-\frac{\pi}{12}; \frac{\pi}{4}; \frac{11\pi}{12}; \frac{5\pi}{4}$ .

3.

4.

$\sqrt[3]{6} = \sqrt[12]{6^4}; \sqrt[4]{10} = \sqrt[12]{10^3}; \sqrt[6]{32} = \sqrt[12]{32^2}$ .

5.

(2x, x)  $y = \frac{x}{2}$ .

6.

7.

$a_1 = 10; d = 5$ ,  $a_n = a_1 + (n - 1)d$ ,  $n = 17$ . :  $a_n = 90$ .

8.

0.  
 :  $\vec{a}\vec{b} = 2b + (-2)(-3) = 2b + 6$ .

9.

:  $\cos x = \sin(\frac{\pi}{2} + x)$ .  
 $\frac{\pi}{2}$ ,

10.

Oy. (3), (4), (5) – (1).  
 0).

2)(x + 1).

$$\frac{(x-3)^2(x+2)}{x^3(x-2)(x+1)} \leq 0.$$

$$: -2, -1, 0, 2, 3.$$

$$: [-2; -1) \cup (0; 2) \cup \{3\}.$$

1 3.

11.

$$2x ($$

$$3x + 7x = 10x$$

10.

12.

13.

$$\frac{1+2\sin\alpha\cos\alpha}{\frac{1}{2}(\cos^2\alpha+\sin^2\alpha+2\sin\alpha\cos\alpha)} = 2.$$

$$\frac{1+\sin 2\alpha}{\sin^2(\frac{\pi}{4}+\alpha)} = \frac{1+2\sin\alpha\cos\alpha}{(\sin\frac{\pi}{4}\cos\alpha+\cos\frac{\pi}{4}\sin\alpha)^2} =$$

14.

$$0$$

$$0.$$

$$0,$$

$$-6, -4, 0, 3.$$

$$(x \geq -4) -$$

$$-6.$$

15.

$$: M = \frac{mRT}{pV}.$$

$$: pVM = mRT,$$

16.

BD).

AO, BP, CO, DO -

( )

(AOB, BOC, COD, AOD),

17.

$$10.$$

$$BC,$$

$$- O,$$

$$BO = OC = 5,$$

BOC -

$$\frac{5\sqrt{3}}{2}.$$

$$5,$$

$$- 7,5.$$

18.

- MT, NT,

T -

AC.

$$: AMK =$$

TNP; KMT = PNC; MBN = NTM.

19.

8.

(1), (2) ( ) (3) ,  
(4) , -  
(5) , -  
(6) ,

20.

$(2 \cdot 1,5 = 3 \text{ м}^2)$   $(0,6 \cdot 2 = 1,2 \text{ м}^2)$   $49,8 \text{ м}^2$   
 $0,4 \text{ кг}$   
 $49,8 \cdot 0,4 = 19,92 \text{ кг}$

21. 1- , 2- , 3- , 4-

$1- y = \sqrt[k]{x} -$   $x, k$   
 $2- ;$   $IV, k$   
 $3- Oy, Ox,$   
 $k > \frac{1}{2}$   
 $x_B = -\frac{b}{2a}, x_B < 0, a < 0 \Rightarrow b < 0 \Rightarrow -(k-2) < 0 \Rightarrow$   
 $k > 2. : k = 3; 4 -$

$y = b \Rightarrow k = 0.$

22. 1- , 2- , 3- , 4-

$1 \left( \frac{\sqrt{a}+1}{\sqrt{a}-1} - \frac{4\sqrt{a}}{a-1} \right) : \frac{\sqrt{a}-1}{a+\sqrt{a}} = \left( \frac{(\sqrt{a}+1)^2 - 4\sqrt{a}}{a-1} \right) : \frac{\sqrt{a}-1}{\sqrt{a}(\sqrt{a}+1)} = \left( \frac{(\sqrt{a}-1)^2}{(\sqrt{a}-1)(\sqrt{a}+1)} \right) \cdot \frac{\sqrt{a}(\sqrt{a}+1)}{\sqrt{a}-1} = \sqrt{a}.$   
 $2 \frac{a^5 \cdot a^{-2}}{(a^3)^{-\frac{1}{2}}} = \frac{a^{\frac{5}{3}-2}}{a^{\frac{4}{3}(-\frac{1}{2})}} = \frac{a^{-\frac{1}{3}}}{a^{-\frac{2}{3}}} = a^{-\frac{3}{6}} = a^{-\frac{1}{2}} = \frac{1}{\sqrt{a}}.$   
 $3 \frac{a}{a+2} - \frac{(a-2)^2}{2} \cdot \left( \frac{1}{a^2-4} + \frac{1}{a^2-4a+4} \right) = \frac{a}{a+2} - \frac{(a-2)^2}{2} \cdot \left( \frac{a-2+a+2}{(a+2)(a-2)^2} \right) = \frac{a}{a+2} - \frac{a}{a+2} = 0.$   
 $4 \frac{\sin \pi a}{\cos \pi a} \left( \frac{1}{\sin^2 \pi a} - 1 \right) = \operatorname{tg} \pi a (1 + \operatorname{ctg}^2 \pi a - 1) = \operatorname{tg} \pi a \cdot \operatorname{ctg}^2 \pi a = \operatorname{ctg} \pi a = \operatorname{ctg} \frac{9\pi}{4} = 1$

23. 1- , 2- , 3- , 4-

$4$   
 $8$   $12$  ;  $8$   $5$   $6$  ;  $5$

24. 1- , 2- , 3- , 4-

$BOC$   $OCB = 30^\circ$   
 $30^\circ$  ;  $BO = 6 \text{ см}$   
 $BOC$  ;  $\frac{BO}{BC} =$   
 $\sin 60^\circ \Rightarrow BC = 4\sqrt{3} \text{ см}$  ;  $AB = 4\sqrt{3} \text{ см}, BD = 12 \text{ см}$   
 $R = 2\sqrt{3} \text{ см}$   $BCD: BDC = 30^\circ \Rightarrow BH = \frac{1}{2}BD = 6 \text{ см}$

25. 24

$x -$   
 $(x-3)$   $\frac{1}{x}$   $-\frac{1}{x-3}$   
 $16$   $-7$   
 $2$  ;  $-2$   $24$

26. 23

$\sqrt{8x^2-7} = 3x-4 \Leftrightarrow 8x^2-7 = 9x^2-24x+16 \Leftrightarrow x^2-$

$$24x + 23 = 0.$$

$$: 1 \quad 23.$$

27. -3

$$\Leftrightarrow \begin{cases} \frac{x^2 - y^2}{xy} = -\frac{8}{3} \\ y = \frac{3x+13}{4} \end{cases} \Leftrightarrow \begin{cases} 3x^2 - 3y^2 = -8xy \\ y = \frac{3x+13}{4} \end{cases} \Leftrightarrow \begin{cases} 3x^2 - \frac{3}{16}(9x^2 + 78x + 169) = -6x^2 - 26x \\ y = \frac{3x+13}{4} \end{cases} \Leftrightarrow \begin{cases} 117x^2 + 182x - 507 = 0 \\ y = \frac{3x+13}{4} \end{cases}$$

$$: x_1 = \frac{13}{9}, x_2 = -3. \quad : y_1 = \frac{13}{3}, y_2 = 1.$$

28. 1, 5

$$\frac{4x-4}{x} + \frac{x^2+4}{x^2+x} = \frac{6+x}{x+1} \quad \frac{4x-4}{x} + \frac{x^2+4}{x(x+1)} = \frac{6+x}{x+1} \quad \frac{4x^2-4+x^2+4}{x(x+1)} = \frac{6x+x^2}{x(x+1)} \quad (x \neq 0; -1),$$

$$0; 1, 5.$$

29. 54

$$A_1B_1 - \quad , \quad A_1B_1 = \frac{1}{2}AB = 5.$$

$$: MB_1 = \frac{1}{2}MB = 4. \quad MA_1B_1, \quad : MA_1^2 + MB_1^2 = ABA_1B_1$$

$$: S = \frac{1}{2}d_1d_2\sin\varphi.$$

$$, \quad BB_1 = 12; AA_1 = 9. \quad : S = \frac{1}{2} \cdot 12 \cdot 9 = 54.$$

30. 10

$$AM \quad BC, M - \quad BC. \quad ABH \quad BAM - \quad , \quad BM = AH = 5.$$

$$M - \quad BC, \quad BC = 2BM = 10.$$

31. 2

$$|\sqrt{a+2} - a| = \sqrt{a+2} - a: \quad , \quad \sqrt{a+2} - a \geq 0$$

$$\sqrt{a+2} \geq a. \quad ( \quad )$$

$$\begin{cases} a \geq 0 \\ a+2 \geq a^2 \end{cases} \quad .1 \quad , \quad : a \in (-\infty; 2].$$

$$\begin{cases} a < 0 \\ a - 6y = - \end{cases}$$

$$a \in [-2; 2].$$

32. 1

$$: x^2 - 2x + 3 = (x-1)^2 + 2 \quad 2.$$

$$2. \quad , \quad 2.$$

$$2 \quad , \quad x = 1.$$