

Билет № 1001

Задание № 1

The pedestrian went 8 km. After that he increased the speed by 1 km/hour and went 5 km. If he went with the increasing speed all the way he went by 24 min less. Determine an original speed of the pedestrian.

Ответы

- ☐ 4,5
- ☐ 4,2
- ☐ 4
- ☐ 5,5
- ☐ 5

Задание № 2

A swimming pool contains 30 m³ of water. It became empty and filled again. It took 8 hours. Determine time of filling if the pumping water is less than dumping water by 4 m³ per hour.

Ответы

- ☐ 4,5
- ☐ 5
- ☐ 6
- ☐ 6,5
- ☐ 5,5

Задание № 3

Areas of similar triangles equal to 50 cm² and 32 cm². The sum of their perimeters equals to 117 cm. Determine the perimeter of the larger triangle.

Ответы

- ☐ 85 см
- ☐ 80 см
- ☐ 75 см
- ☐ 65 см
- ☐ 70 см

Задание № 4

Solve the equation. Determine the interval that contains all solutions to the equation $5^{2x-1} + 5^{x+1} = 250$.

Ответы

- ☐ [1;2]
- ☐ (0;1)
- ☐ (1;2)
- ☐ (0;1,5)
- ☐ (0;1]

Задание № 5

$$\frac{\cos 70^0 \cdot \cos 20^0 + \sin 20^0 \cdot \cos 160^0}{\cos 23^0 \cdot \sin 15^0 - \cos 81^0 \cdot \sin 14^0}$$

Determine a value of the expression

Ответы

- ☐ 3
- ☐ 0
- ☐ -1
- ☐ 1/2
- ☐ 1

Задание № 6

Solve the inequality $\log_{\frac{1}{2}}(2x-3) + \log_2 13 \geq 1$

Ответы

- ☐ $(19/4; \infty)$
- ☐ $\emptyset$
- ☐ $(3/2; 19/4]$
- ☐ $(-\infty; 3/2)$
- ☐ $(3/2; 4)$

Задание № 7

Determine four numbers such that they are terms of a geometric progression. The sum of the first and the third terms equals to 35. The sum of the second and the fourth terms equals to (-70) . Evaluate the sum $4b_1 + 3b_2 + 2b_3 + b_4$.

Ответы

- ☐ 8
- ☐ -12
- ☐ 17
- ☐ -14
- ☐ -8

Задание № 8

Determine a number of integer values on the graph of the function $y = \left| |x+1| - 4 \right|$ which are less than 1?

Ответы

- ☐ 0
- ☐ 6
- ☐ 4
- ☐ 2
- ☐ ∞

Задание № 9

Consider a trapezoid ABCD with bases AB and CD. Let points M and N be centers of sides AD and BC. Vectors have coordinates $\vec{MN}(-6; 2; -4)$ and $\vec{CD}(9; -3; 6)$. Evaluate a sum of coordinates for the vector $\vec{AB}$.

Ответы

- ☐ -3
- ☐ -5
- ☐ -6
- ☐ -2
- ☐ -4

Задание № 10

Determine a domain of definition for the function $y = \arctg(x - 2)$

Ответы

- ☐ $(2; \infty)$
- ☐ $[2; \infty)$
- ☐ $[0; 2]$
- ☐ $(-\infty; \infty)$
- ☐ $(-\infty; 2)$

Задание № 11

Solve the equation $|2 - 6x| + \frac{3x}{2} = 1$ and determine a product of the solutions

Ответы

- ☐ 16/21
- ☐ 4/45
- ☐ 12
- ☐ 8/15
- ☐ 18/35

Задание № 12

Determine a number of integer values of the parameter a such that the vertex of the parabola $y = (x - 11a)^2 - a^2 - 2a + 15$ has a positive y-coordinate and negative x-coordinate.

Ответы

- ☐ 4
- ☐ 7
- ☐ 3
- ☐ 5
- ☐ 8

Задание № 13

Evaluate the area of the sphere (in sq. cm) which is inscribed into the cube with the diagonal 4 cm

Ответы

- ☐ $\frac{22\pi}{3}$
- ☐ $\frac{25\pi}{3}$
- ☐ $\frac{20\pi}{3}$
- ☐ $\frac{16\pi}{3}$
- ☐ $\frac{28\pi}{3}$

Задание № 14

If $\sqrt{38-t} - \sqrt{14-t} = 3$, then $\sqrt{38-t} + \sqrt{14-t}$ equals

Ответы

- ☐ 13/2
- ☐ 28/3
- ☐ 11
- ☐ 8
- ☐ 20/3

Задание № 15

$$\frac{\left[\left(40\frac{7}{30} - 38\frac{5}{12} \right) : 10,9 + \left(\frac{7}{8} - \frac{7}{30} \right) \cdot 1\frac{9}{11} \right] \cdot 4,2}{0,008}$$

Evaluate

Ответы

- ☐ 900
- ☐ 500
- ☐ 700
- ☐ 100
- ☐ .300

Задание № 16

Solve the system $\begin{cases} x^2 - y^2 = 5 \\ x + y = -1 \end{cases}$. Evaluate a value of $x + y$

Ответы

- ☐ No right answer
- ☐ 2
- ☐ -2
- ☐ -1
- ☐ 1

Билет № 1002

Задание № 1

A swimming pool contains 30 m^3 of water. It became empty and filled again. It took 8 hours. Determine time of filling if the pumping water is less than dumping water by 4 m^3 per hour.

Ответы

- ☐ 6,5
- ☐ 5,5
- ☐ 4,5
- ☐ 5
- ☐ 6

Задание № 2

One worker had to make 36 pieces, the second 20 pieces. The first worker did more per day on the 2 piece than the second one, and spent for his order one day less than the second worker. How many pieces did the workers do per day? Evaluate their product.

Ответы

- ☐ 8
- ☐ 9
- ☐ 12
- ☐ 10
- ☐ 15

Задание № 3

Determine the larger base of rectangular trapezoid. The lateral sides equal 8 and 10. The small base equals 10.

Ответы

- ☐ 18
- ☐ 16
- ☐ 12
- ☐ 20
- ☐ 14

Задание № 4

Solve the equation. Determine the interval that contains all solutions to the equation

$$4^x - 3^{x-0,5} = 3^{x+0,5} - 2^{2x-1}.$$

Ответы

- ☐ $(0;1)$
- ☐ $(3;4)$
- ☐ $(1;2)$
- ☐ $(2;3)$
- ☐ $(-1;0)$

Задание № 5

Determine a value of the expression $\frac{\sin 22^\circ \cdot \cos 8^\circ + \cos 158^\circ \cdot \cos 98^\circ}{\sin 23^\circ \cdot \cos 67^\circ + \cos 157^\circ \cdot \cos 157^\circ}$

Ответы

- ☐ -1
☐ 1/2
☐ 0
☐ 1
☐ -1/2

Задание № 6

Let k — be a number of solutions to the equation $\log_{7-x}(2x^2 - 19x + 43) = 2$ and x_0 — is the negative solution. Determine a value of the expression $2k + x_0$.

Ответы

- ☐ 4
☐ - 5
☐ 3
☐ 0
☐ 1

Задание № 7

A sum of the third and the ninth terms of an arithmetic progression equals to 8. Evaluate a sum of eleven terms in the arithmetic progression.

Ответы

- ☐ 44
☐ 48
☐ 32
☐ 56
☐ 38

Задание № 8

Determine a value of a parameter a such that three straight lines $ax + y = a + 1$, $x - ay = -3$, $ax + ay = a^2 - 8$ have only one point of intersection.

Ответы

- ☐ 3
☐ 1
☐ таких a нет
☐ 2
☐ 4

Задание № 9

Determine a sum of coordinates of the vertex C for the given parallelogram ABCD with

$A(-4;6;-5)$, $AB(3;1;3)$ and $BD(-1;2;-2)$.

Ответы

- ☐ 10
- ☐ 7
- ☐ 9
- ☐ 11
- ☐ 8

Задание № 10

Determine a domain of definition for the function $y = \operatorname{arctg}(x - 2)$

Ответы

- ☐ $(-\infty; 2)$
- ☐ $[2; \infty)$
- ☐ $[0; 2]$
- ☐ $(-\infty; \infty)$
- ☐ $(2; \infty)$

Задание № 11

Determine a distance between points of intersection of graphs for the functions $y = |x + 2|$ and $y = \frac{x}{2} - 2$.

Ответы

- ☐ $4\sqrt{5}$
- ☐ $\sqrt{5}$
- ☐ $3\sqrt{5}$
- ☐ $5\sqrt{5}$
- ☐ $2\sqrt{5}$

Задание № 12

Determine a number of integer values of the parameter a such that both coordinates of the vertex for the parabola $y = (x - 10a)^2 - a^2 + 4$ are positive.

Ответы

- ☐ 2
- ☐ 4
- ☐ 5
- ☐ 3
- ☐ 1

Задание № 13

The sides of the base of the rectangular parallelepiped are equal to a и b . The diagonal of the parallelepiped is inclined to the base plane at an angle 60° . Evaluate the side surface of the parallelepiped.

Ответы

- ☐ $(a+b)\sqrt{2(a^2+b^2)}$
- ☐ $2(a+b)\sqrt{a^2+b^2}$
- ☐ $\sqrt{a^2+b^2}(a+b)$
- ☐ $\frac{a+b}{2}\sqrt{3(a^2+b^2)}$
- ☐ $2(a+b)\sqrt{3(a^2+b^2)}$

Задание № 14

If $\sqrt{22-t} - \sqrt{8-t} = 3$, then $\sqrt{22-t} + \sqrt{8-t}$ equals

Ответы

- ☐ $14/3$
- ☐ $15/2$
- ☐ 7
- ☐ 17
- ☐ $17/3$

Задание № 15

$$\begin{cases} \frac{4}{5}x - \frac{1}{10} \leq 1 - \frac{5}{2}x \\ 4\frac{1}{2} - \frac{x}{2} > \frac{6-3x}{-4} \end{cases}$$

Solve the system of inequalities

Ответы

- ☐ $\emptyset$
- ☐ $(-\infty; 1/3]$
- ☐ $(-1/3; 1/3]$
- ☐ $[1/3; \infty)$
- ☐ $[-1/3; 1/3)$

Задание № 16

Solve the system $\begin{cases} 5x + 2y = -3 \\ x - 3y = -4 \end{cases}$. Evaluate a value of $x + y$

Ответы

- ☐ 3
- ☐ -2
- ☐ 2
- ☐ 0
- ☐ No right answer

Билет № 1003

Задание № 1

One worker had to make 36 pieces, the second 20 pieces. The first worker did more per day on the 2 piece than the second one, and spent for his order one day less than the second worker. How many pieces did the workers do per day? Evaluate their product.

Ответы

- ☐ 8
- ☐ 12
- ☐ 15
- ☐ 10
- ☐ 9

Задание № 2

An auditorium contains 320 seats. A number of seats in each row was increased by 4 and add an additional row. After this the number of seats equals 420 . How many rows are in the auditorium? Evaluate the larger value.

Ответы

- ☐ 21
- ☐ 20
- ☐ 19
- ☐ 23
- ☐ 22

Задание № 3

Determine an area of the triangle. The lengths of legs for the right-angled triangle are solutions to the equation $x^2 - 2\sqrt{5}x + 3 = 0$

Ответы

- ☐ 1
- ☐ $(\sqrt{5} + \sqrt{2})/2$
- ☐ 1,5
- ☐ 3
- ☐ 2

Задание № 4

Solve the equation $\sqrt{x+2}(8 \cdot 2^x + 2 \cdot 2^{-x} - 17) = 0$ and evaluate a sum of these solutions

Ответы

- ☐ - 4
- ☐ 2
- ☐ -5
- ☐ -1
- ☐ -2

Задание № 5

$$\cos\left(\operatorname{arccotg}\left(-\frac{1}{4}\right) + \frac{5}{2}\pi\right)$$

Evaluate a value of the expression . It equals

Ответы

- ☐ $-\frac{\sqrt{17}}{17}$
- ☐ $\frac{\sqrt{17}}{17}$
- ☐ $-\frac{4}{17}\sqrt{17}$
- ☐ $\frac{4}{17}\sqrt{17}$
- ☐ -0,97

Задание № 6

Let k — be a number of solutions to the equation $\log_{7-x}(2x^2 - 19x + 43) = 2$ and x_0 — is the negative solution. Determine a value of the expression $2k + x_0$.

Ответы

- ☐ 4
- ☐ 0
- ☐ 1
- ☐ - 5
- ☐ 3

Задание № 7

The sum of the first , the second and the third terms of an increasing geometric progression equals to 13. Their product equals to 27. Evaluate a sum of of five terms in the progression.

Ответы

- ☐ 145
- ☐ 121
- ☐ 81
- ☐ 134
- ☐ 190

Задание № 8

Determine a value of a parameter such that a number of intersection for graphs of the functions

$y = (|x| - 2)(|x| - 3)$ and $y = a$ equals three.

Ответы

- ☐ $a = -2$
- ☐ $a = -4$
- ☐ $a = 6$
- ☐ $a = -1$

☐ $a = 4$

Задание № 9

Consider a trapezoid ABCD with bases AB and CD. Let points M and N be centers of sides AD and BC. Vectors have coordinates $\vec{MN}(-6;2;-4)$ and $\vec{CD}(9;-3;6)$. Evaluate a sum of coordinates for the vector $\vec{AB}$.

Ответы

- ☐ -4
☐ -2
☐ -3
☐ -6
☐ -5

Задание № 10

Determine a domain of definition for the function $y = \arccos \frac{2x-1}{3}$

Ответы

- ☐ $[3/2; \infty)$
☐ $[-1; 2]$
☐ $[1/2; 1]$
☐ $\emptyset$
☐ $(-\infty; \infty)$

Задание № 11

Determine a distance between points of intersection of graphs for the functions $y = |x + 2|$ and $y = \frac{x}{2} - 2$.

Ответы

- ☐ $3\sqrt{5}$
☐ $5\sqrt{5}$
☐ $\sqrt{5}$
☐ $4\sqrt{5}$
☐ $2\sqrt{5}$

Задание № 12

Determine a number of integer values of the parameter a such that the vertex of the parabola $y = (x - 11a)^2 - a^2 - 2a + 15$ has a positive y-coordinate and negative x-coordinate.

Ответы

- ☐ 8

- ☐ 5
- ☐ 7
- ☐ 4
- ☐ 3

Задание № 13

The volume of the ball is equal $12\sqrt{3}$. Determine the volume of another ball, whose surface area is greater than the surface area of the first ball by 9 times.

Ответы

- ☐ 244
- ☐ 306
- ☐ 324
- ☐ 208
- ☐ 214

Задание № 14

If $\sqrt{23-t} - \sqrt{8-t} = 3$, then $\sqrt{23-t} + \sqrt{8-t}$ equals

Ответы

- ☐ 4
- ☐ 15/2
- ☐ 8
- ☐ 13/3
- ☐ 5

Задание № 15

$$6 : \frac{1}{3} - 0,8 : \frac{1,5}{\frac{3}{2} \cdot 0,4 \cdot \frac{50}{1 : \frac{1}{2}}} + \frac{1}{4} + \frac{1 + \frac{1}{2} \cdot \frac{1}{0,25}}{6 - \frac{46}{1 + 2,2 \cdot 10}}$$

Evaluate

Ответы

- ☐ 1
- ☐ 11
- ☐ 101
- ☐ 21
- ☐ 10,1

Задание № 16

Solve the system $\begin{cases} 5x + 2y = -3 \\ x - 3y = -4 \end{cases}$. Evaluate a value of $x + y$

Ответы

- ☐ 2
- ☐ No right answer

- ☐ 3
- ☐ -2
- ☐ 0