

This mathematics test contains 15 questions. In all questions only one answer is correct and brings 2 points. Wrong answer, as well as the case of more than one answer, brings 0 points.

1. The value of the expression

$$\left(0,9 : 0,64 - \left(1,5 - \frac{2}{5}\right) \cdot \frac{10}{11} + 27^0\right) \cdot \left(3\frac{2}{9} + \frac{1}{3}\right)$$

is equal to:

- 1) 15; 2)  $\frac{5}{3}$ ; 3)  $\frac{3}{2}$ ; 4) 1; 5) 5.
2. The price of juice syrup is 900 RSD per liter. If we assume that water is free, the amount of water that should be added to 350l of syrup, to get diluted juice with price of 700 RSD per liter, is:  
1) 180l; 2) 120l; 3) 50l; 4) 100l; 5) 200l.
3. Values of real parameter  $m$ , for which the minimum value of the function  $f(x) = 4x^2 - (m - 2)x - m$  is greater than 1, are:  
1)  $2 < m < 4$ ; 2)  $m < 2$ ; 3)  $-10 < m < -2$ ;  
4)  $m < -10$  or  $m > -2$ ; 5)  $m < -4$  or  $m > 4$ .
4. If the ordered pair of real numbers  $(x, y)$  is the solution of the system of equations,  $x + y = 7$ ,  $x^2 - y^2 - 6x = -1$ , then the product  $xy$  is equal to:  
1) 6; 2) -8; 3) 7; 4) 78; 5) 12.

5. The sum of all solutions of the equation

$$\left(7 + 4\sqrt{3}\right)^{x-3} + \left(7 - 4\sqrt{3}\right)^{x-3} = 14$$

is equal to:

- 1) 8; 2) 14; 3) 6; 4) 2; 5) 0.
6. All solutions of the inequation

$$\log_2(x + 6) + \log_2(x - 2) < 2 \log_2 x$$

are:

- 1)  $x > 2$ ; 2)  $x > 3$ ; 3)  $2 < x < 3$ ; 4)  $2 < x < 12$ ; 5)  $0 < x < 1$  or  $1 < x < 3$ .
7. If  $\sin \alpha = \frac{4}{5}$  and  $\frac{\pi}{2} < \alpha < \pi$ , then  $\operatorname{ctg} \alpha$  is equal to:  
1)  $\frac{3}{5}$ ; 2)  $-\frac{3}{5}$ ; 3)  $-\frac{4}{3}$ ; 4)  $-\frac{3}{4}$ ; 5)  $\frac{1}{3}$ .

8. The number of solutions of the equation  $\cos\left(2x + \frac{\pi}{3}\right) - \cos 2x = -\frac{1}{2}$  in interval  $\left[\frac{\pi}{2}, \frac{3\pi}{2}\right]$  is:  
 1) 1; 2) 2; 3) 3; 4) 4; 5) 5.
9. The point  $M$  with coordinates  $(A, B)$  belongs to the line  $x - y - 1 = 0$ . If the sum of squares of distances between point  $M$  and points  $(6, 0)$  and  $(2, -2)$  is equal to 26, then the coordinates  $(A, B)$  satisfy:  
 1)  $A + B = 5$ ; 2)  $A + B = 3$ ; 3)  $A + 2B = 0$ ; 4)  $2A - B = 0$ ; 5)  $2A + B = 0$ .
10. The tangent lines  $t_1$  and  $t_2$  to the ellipse  $9x^2 + 16y^2 = 144$ , contain the point  $A = (0, 5)$ . The product of slopes of  $t_1$  and  $t_2$  is equal to:  
 1)  $-\frac{1}{3}$ ; 2)  $-3$ ; 3)  $-\frac{17}{8}$ ; 4)  $-1$ ; 5)  $-\frac{1}{4}$ .
11. If  $f\left(\frac{x+3}{5}\right) = 3 - x$ , then  $f(-403)$  is equal to:  
 1) 2020; 2) 2018; 3)  $-2018$ ; 4) 2019; 5) 2021.
12. If  $f(x) = \log_6 x + 3 \log_3(9x)$ , then  $f(x) + f\left(\frac{1}{x}\right)$  is equal to:  
 1) 0; 2) 3; 3) 9; 4) 12; 5) 6.
13. In ascending arithmetic sequence the sum of the second, the fourth and the sixth term is 27, and the product of the third, the fourth and the fifth term is 648. The fifth term of that sequence is equal to:  
 1) 15; 2) 9; 3) 30; 4) 3; 5) 12.
14. The binomial coefficient in term which contains  $x^2$  in the binomial expansion of the expression  $\left(\frac{1}{\sqrt[3]{x}} + x^2\right)^8$  is equal to:  
 1) 16; 2) 28; 3) 70; 4) 8; 5) 56.
15. The value of the expression

$$\left(\frac{1}{a^2 - 4} - \frac{a}{a^3 + 8}\right) : \frac{1}{(a - 1)^2 + 3},$$

for  $a = 8$ , is equal to:

- 1) 4; 2) 1; 3)  $\frac{1}{15}$ ; 4)  $\frac{1}{3}$ ; 5)  $-\frac{7}{15}$ .