

- 1) The set of all solutions of the inequality $\frac{3}{1-x} < 1$ in the domain \mathbb{R} is:
- $(-\infty, -2)$
 - $(-\infty, -2) \cup (1, +\infty)$
 - $(-2, 1)$
 - $(1, +\infty)$
 - none of the answers above is correct
- 2) The definition domain of the function $y = \frac{\sqrt{1-x}}{\log(x-1)}$ is the set :
- \emptyset
 - $\{1\}$
 - $(-1, 1)$
 - $\mathbb{R} - \{1\}$
 - none of the answers above is correct
- 3) The goniometric form of the complex number $-\frac{1}{2} - \frac{\sqrt{3}}{2}i$ is equal to :
- $\cos \frac{4}{3}\pi + i \sin \frac{4}{3}\pi$
 - $\cos \frac{5}{3}\pi + i \sin \frac{5}{3}\pi$
 - $\sin \frac{\pi}{6} + i \cos \frac{5}{6}\pi$
 - $\sin \frac{5}{6}\pi + i \cos \frac{5}{6}\pi$
 - none of the answers above is correct
- 4) For an arithmetic sequence it holds $a_5 - a_1 = 12$, $a_3 = 7$. The a_{12} member is equal to the number :
- 34
 - 31
 - 27
 - 19
 - none of the answers above is correct
- 5) One root of the equation $x^2 + 3\sqrt{n}x + n + 1 = 0$ is a double real root for :
- $n = 1$
 - $n = 4$
 - $n = 0$
 - $n = 4/5$
 - none of the answers above is correct
- 6) Decide which values $x, y \in \mathbb{R}$ give the solution of the given set of equations $\log_{\frac{1}{3}} x - \log_{\frac{1}{3}} y = 0 \wedge y^2 - 2x - 3 = 0$:
- $x = y = 0$
 - $x = y = 3$
 - $x = 0, y = 3$
 - $x = 3, y = 0$
 - none of the answers above is correct
- 7) The function $y = -5 \cdot \frac{|x|}{x}$ is over the whole definition domain
- even, increasing
 - even, decreasing
 - odd, increasing
 - odd, decreasing
 - none of the answers above is correct
- 8) The set of all solutions of the equation $(1 - \cos x)(2 - \sin x) = 0$ is the set :
- $\{(2k+1)\frac{\pi}{2}, k \in \mathbb{Z}\}$
 - $\{k\pi, k \in \mathbb{Z}\}$
 - $\{2k\pi, k \in \mathbb{Z}\}$
 - $\{(2k+1)\pi, k \in \mathbb{Z}\}$
 - none of the answers above is correct
- 9) The number of points of the circle $x^2 + y^2 - 6x - 10y + 9 = 0$ common with the axes of coordinates is equal to the number :
- 0
 - 1
 - 2
 - 3
 - none of the answers above is correct
- 10) The straight lines $p: 3x + 4y - 2 = 0$ and $q: 8x - 6y + 4 = 0$ are closing an angle of size :
- $\pi/6$
 - $\pi/3$
 - $\pi/2$
 - $2\pi/3$
 - none of the answers above is correct

11) All real solutions of the equation $4^{x+3} - 4^x = 63$ belong to the interval :

- a) $\langle -1, 0 \rangle$
- b) $\langle 0, 1 \rangle$
- c) $\langle 1, 2 \rangle$
- d) $\langle 2, 4 \rangle$
- e) none of the answers above is correct

12) Define the number $y \in \mathbb{R}$ such, that the point $A = [2, y]$ is situated on the straight line which is parallel with the line $y = 4x+5$ and is passing the point $B = [1, 4]$:

- a) $y = 4$
- b) $y = 8$
- c) $y = 9$
- d) $y = 13$
- e) none of the answers above is correct

13) The negation of statement „At least one dog does not bite“ is the statement :

- a) One dog bites.
- b) All dogs do not bite.
- c) More than one dog bite.
- d) All dogs bite.
- e) none of the answers above is correct

14) The absolute value of complex number $z = i^{58} + i^{160}$ is equal to the number :

- a) 0
- b) 2
- c) 1
- d) i
- e) none of the answers above is correct

15) The equation $\log_3 27x + \log_3 x^2 = 15$ has one root only, that is situated within the interval :

- a) (71, 83)
- b) (49, 57)
- c) (27, 50)
- d) (3, 15)
- e) none of the answers above is correct

16) The number of all real solutions of the equation

$\sqrt{5-x} = x+1$ is equal to the number :

- a) 1
- b) 2
- c) 3
- d) 0
- e) none of the answers above is correct

17) Establish value of the expression $\frac{3 \sin x + \cos x}{\cos x - 3 \sin x}$,

if the $\cot x = 1$:

- a) 0
- b) 1
- c) 2
- d) -2
- e) none of the answers above is correct

18) The circle drawn around a rectangular triangle with legs long $\sqrt{2}$ is itself long :

- a) $\sqrt{2\pi}$
- b) 6π
- c) 4π
- d) 2π
- e) none of the answers above is correct

19) For every $x \geq 0$ the expression $\sqrt{x} \cdot \sqrt[3]{\sqrt{x}}$ is equal to:

- a) $x^{\frac{7}{6}}$
- b) $x^{\frac{5}{6}}$
- c) $x^{\frac{7}{12}}$
- d) $x^{\frac{3}{2}}$
- e) none of the answers above is correct

20) The number of common points of the parabola $y^2 = 8x$ and the straight line $p: x+y = 0$ is equal to :

- a) 2
- b) 1
- c) 0
- d) ∞
- e) none of the answers above is correct