

VARIANT 191

1 Calculate the value of expression $\log_{128} 125 \cdot \log_{25} 32$.

- 1) $15/11$ 2) $15/14$ 3) $15/13$ 4) $15/17$

2 Solve the inequality $\frac{x^2 - |x| - 12}{|x|} \leq 0$.

- 1) $[-4; 0) \cup (0; 4]$ 2) $[-3; 0) \cup (0; 4]$ 3) $[-4; 0) \cup (0; 3]$ 4) $[-3; 0) \cup (0; 3]$

3 Solve the equation $\frac{5x^2}{x+2} - \frac{x+5}{x^2} = \frac{4x^2-3}{x^2}$. Write down the answer as the sum of roots.

- 1) 4 2) 2 3) 3 4) 1

4 Calculate the value of expression $\operatorname{tg} \frac{19\pi}{4} \cdot \sin \frac{13\pi}{6}$.

- 1) $-0,25$ 2) $-0,45$ 3) $-0,6$ 4) $-0,5$

5 What is the angle between tangent to the graph of the function $y = -6\sqrt{x} + 7$ and abscissa axis at the point $x = 3$?

- 1) 150° 2) 120° 3) 90° 4) 45°
- 6 Solve the system of equations $\begin{cases} 3x^2 - 4xy + 2y^2 = 17, \\ x^2 - y^2 + 16 = 0. \end{cases}$ Write down the answer $\sum(x_i^2 + y_i^2)$, where (x_i, y_i) - system of equations solutions.

- 1) $1400/9$ 2) $1300/9$ 3) $1000/9$ 4) $1700/9$

7 Find all values of the parameter a for which the equation $3\sin x - 4\cos x = a$ has a solution.

- 1) $[-5; 5]$ 2) $[-3; 3]$ 3) $[-4; 4]$ 4) $[-5; 4]$

8 The bisector of the angle A at the base of the trapezoid $ABCD$ is perpendicular to its diagonal and crosses the side CD at the point E and $CE:ED = 2:3$. Find the ratio of $BC:CK$, where K is the intersection point of bisector with line BC .

- 1) $2:3$ 2) $1:2$ 3) $3:4$ 4) $1:3$

9 Solve the inequality $\log_3(x^2 + 6x + 10) + 0,5 \log_{\frac{1}{9}}(x + 2) \leq 0,5 \log_{\sqrt{3}} 7$.

- 1) $(-2; 4]$ 2) $(-2; 3,5]$ 3) $(-2; 3]$ 4) $(-2; 5]$

10 $SABCD$ is a regular quadrangle pyramid, all edges of pyramid have length of 1. Point E is a middle of SF . Find the angle between ED and plane ACS

- 1) $\arcsin(0,15\sqrt{30})$ 2) $\arcsin(0,2\sqrt{30})$ 3) $\arcsin(0,1\sqrt{30})$ 4) $\arcsin(0,1\sqrt{30})$

You can provide your own version of the answer to any problem.

Card 1

1. A file of 840 MB is transmitted through a certain connection in 14 seconds. Determine the size of the file that can be transmitted through another connection at a speed that is increased by 4 times in 30 seconds.
2. For the logical expression $(A \wedge B \wedge C) \vee \neg(A \wedge \neg B) \vee (A \wedge B)$, construct a truth table and determine the values of the variables A, B, and C for which it takes a false value.
3. Calculate the value of the expression. Write the answer in decimal notation.

$$10011010_2 + 10111_2 - 1001111_2$$

4. Determine the number that will be printed as a result of the following algorithm (the algorithm is presented in four languages):

BASIC	Pascal
<pre> DIM X0, Y AS INTEGER X0 = 11 Y = F(X0) PRINT Y FUNCTION F (x) IF x<=5 THEN F = 2 ELSE F= (x + 1) * F(x-3) END IF END FUNCTION </pre>	<pre> var x0, Y :integer; function F(x: integer):integer; begin if x<=5 then F:=2 else F:= (x + 1) * F (x-3); end; begin x0 := 11; Y := F(x0); write(Y); end. </pre>
C	Algorithmic language
<pre> int F(int x) { if (x<=5) return 2; else return (x + 1) * F (x-3); } void main() { int x0, Y; x0 = 11; Y = F(x0); printf("%d", Y); } </pre>	<pre> нач цел x0, Y x0 := 11 Y:= F(x0) вывод Y кон алг цел F(цел x) нач если x<=5 то знач :=2 иначе знач:=(x + 1) * F(x-3) все кон </pre>

5. How many different sets of values of logical variables $x_1, x_2, \dots, x_{10}, x_{11}$, exist, that satisfy all of the conditions listed below?

$$\neg((x_{10} \equiv x_8) \vee (x_9 \equiv x_7)) \vee ((x_{10} \equiv x_8) \wedge (x_9 \equiv x_7)) = 0$$

$$\neg((x_9 \equiv x_7) \vee (x_6 \equiv x_4)) \vee ((x_9 \equiv x_7) \wedge (x_6 \equiv x_4)) = 0$$

$$\neg((x_6 \equiv x_4) \vee (x_5 \equiv x_3)) \vee ((x_6 \equiv x_4) \wedge (x_5 \equiv x_3)) = 0$$

$$\neg((x_5 \equiv x_3) \vee (x_2 \equiv x_1)) \vee ((x_5 \equiv x_3) \wedge (x_2 \equiv x_1)) = 0$$

$$\neg(((x_1 \equiv x_2) \rightarrow (\neg(x_3 \equiv x_5))) \rightarrow x_{10}) \wedge (\neg x_{11} \vee x_{11}) = 1$$