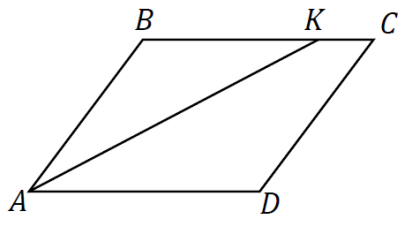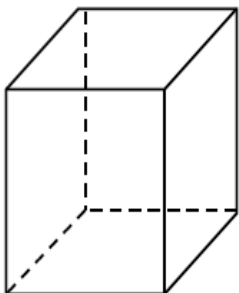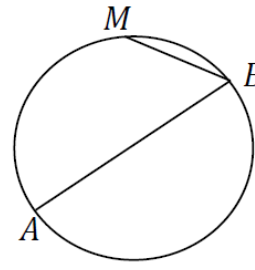| No.	Items	Score	
	ALGEBRA		
1.	Calculate: $\sqrt[3]{16} \cdot 32^{\frac{1}{3}}$. *Solution:* *Answer:*_____.	L 0 1 2 3 4 5	L 0 1 2 3 4 5
2.	Determine the absolute value of the complex number z, such that $zi = (2 - i)(1 + 2i)$, where $i^2 = -1$. *Solution:* *Answer:*_____.	L 0 1 2 3 4 5 6 7 8	L 0 1 2 3 4 5 6 7 8
3.	Solve in the set $\mathbb{R} \times \mathbb{R} \times \mathbb{R}$ the system of equations $\begin{cases} x_1 + 2x_2 + 3x_3 = 10, \\ 2x_1 - x_2 = 4, \\ x_2 + 3x_3 = 5. \end{cases}$ *Solution:* *Answer:*_____.	L 0 1 2 3 4 5 6 7 8	L 0 1 2 3 4 5 6 7 8

4.	Calculate the value of the expression $7^{\frac{2}{\log_2 7}} + \log_7 196 + 2\log_{\frac{1}{7}} 2$.	L 0 1 2 3 4 5 6 7 8	L 0 1 2 3 4 5 6 7 8

Solution:

*Answer:*_____.

5.	Determine the real values of a, such that the equation $x^2 - ax + a + 3 = 0$ has two real solutions x_1 and x_2 which satisfy condition $x_1 x_2^2 + x_1^2 x_2 = 10$.	L 0 1 2 3 4 5 6 7 8	L 0 1 2 3 4 5 6 7 8

Solution:

*Answer:*_____.

GEOMETRY

| 6. | Consider the parallelogram $ABCD$, where AK, $K \in (BC)$, is a bisector of the angle BAD. Determine the measure of the angle AKC, if $m(\angle ABC) = 120°$. | L 0 1 2 3 4 5 | L 0 1 2 3 4 5 |

Solution:

*Answer:*_____.

| 7. | The volume of a regular quadrilateral prism is equal to 12 cm³. Determine the lateral surface area of the prism if it is known that the height is of 3 cm. | L 0 1 2 3 4 5 | L 0 1 2 3 4 5 |

The volume of a regular quadrilateral prism is equal to 12 cm^3. Determine the lateral surface area of the prism if it is known that the height is of 3 cm.

Solution:

*Answer:*_____.

| 8. | A point M lies on a circle, at a distance of 3 cm from the diameter AB. Determine the length of the circle, if it is known that $MB = \sqrt{10}$ cm. | L 0 1 2 3 4 5 6 7 8 | L 0 1 2 3 4 5 6 7 8 |

Solution:

*Answer:*_____.

9. In the regular quadrilateral pyramid $VABCD$, the lateral edge is of 8 cm, and the measure of the angle between edges VD and VB is equal to $120°$. Determine the length of the edge of the base of the pyramid.

Solution:

L 0 1 2 3 4 5 6 7 8   L 0 1 2 3 4 5 6 7 8

*Answer:*_____.

FUNCTIONS

10. Consider the function $f\colon [0; +\infty) \to \mathbb{R}$, $f(x) = \sqrt{x} - 3$. Determine the range $E(f)$ of the function f.

Solution:

L 0 1 2 3 4 5   L 0 1 2 3 4 5

Answer: _____.

11.	Determine the integer values of p, such that the numbers $p + 2$, $3p + 4$, $p + 8$ are the first three terms of a geometric progression.	L 0 1 2 3 4 5 6 7 8	L 0 1 2 3 4 5 6 7 8
	Solution:		
	Answer: _____.		
12.	Consider the functions $f \colon (0; +\infty) \to \mathbb{R}$, $f(x) = \log_2 x$, $g \colon \mathbb{R} \to \mathbb{R}$, $g(x) = ax^2 - (a^2 + 2a - 4)x + 5$. Determine the real nonzero values of a, such that at the zero of the function f, the function g has a maximum.	L 0 1 2 3 4 5 6 7 8	L 0 1 2 3 4 5 6 7 8
	Solution:		
11.			
	Answer: _____.		

ELEMENTS OF COMBINATORICS, MATHEMATICAL STATISTICS, FINANCIAL CALCULUS AND PROBABILITY THEORY

		L 0 1 2 3 4 5 6 7 8	L 0 1 2 3 4 5 6 7 8
13.	In a piggy bank there are 6 coins of 5 lei and 4 coins of 10 lei. Maria get out at random 4 coins from the piggy bank. Determine the probability that with the obtained coins Maria will be able to pay for a ticket of 35 lei. *Solution:*		
	*Answer:*_____.		
14.	After two consecutive indexations of 20% each, the scholarship of some students increased by 660 lei. Determine the students scholarship after indexations. *Solution:*		
	*Answer:*_____.		

Annex

$$\log_a b + \log_a c = \log_a(b \cdot c), \ a \in \mathbb{R}_+^* \setminus \{1\}, \ b, c \in \mathbb{R}_+^*$$

$$\log_a b - \log_a c = \log_a \frac{b}{c}, \ a \in \mathbb{R}_+^* \setminus \{1\}, \ b, c \in \mathbb{R}_+^*$$

$$\log_a b^c = c \log_a b, \ a \in \mathbb{R}_+^* \setminus \{1\}, \ b \in \mathbb{R}_+^*, c \in \mathbb{R}$$

$$\log_{a^c} b = \frac{1}{c} \log_a b, \ a \in \mathbb{R}_+^* \setminus \{1\}, \ b \in \mathbb{R}_+^*, c \in \mathbb{R}^*$$

$$\frac{1}{\log_a b} = \log_b a, \ a, b \in \mathbb{R}_+^* \setminus \{1\}$$

$$a^{\log_a b} = b, \ a \in \mathbb{R}_+^* \setminus \{1\}, \ b \in \mathbb{R}_+^*$$

$$l_{cirle} = 2\pi R$$

$$\mathcal{V}_{prism} = \mathcal{A}_b \cdot H$$

$$b_n = b_1 q^{n-1}$$

$$C_n^m = \frac{n!}{m!\,(n-m)!}, \quad 0 \le m \le n$$