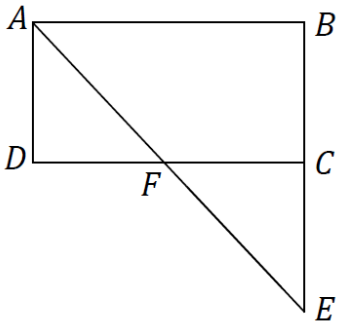
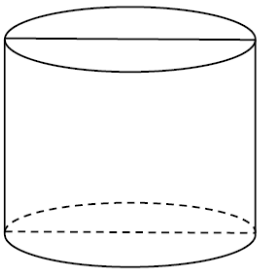
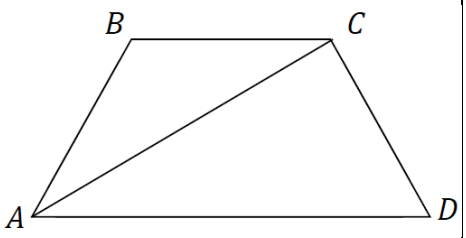
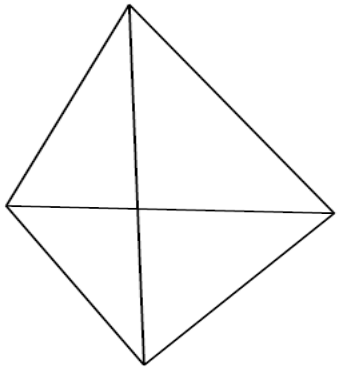
No.	Items	Score	
	ALGEBRA		
1.	Calculate: $64^{\frac{2}{3}} \cdot 0{,}125$. *Solution:* *Answer:*_____.	L 0 1 2 3 4 5	L 0 1 2 3 4 5
2.	Calculate the determinant of the matrix $X = A^2 + B$, where $A = \begin{pmatrix} 1 & -1 \\ 0 & 2 \end{pmatrix}$, $B = \begin{pmatrix} 1 & 2 \\ 3 & -1 \end{pmatrix}$. *Solution:* *Answer:*_____.	L 0 1 2 3 4 5 6 7 8	L 0 1 2 3 4 5 6 7 8
3.	Determine the value of the expression: $5^{\log_{\sqrt{5}} 3} + \log_2 9 - 2\log_2 6$. *Solution:* *Answer:*_____.	L 0 1 2 3 4 5 6 7 8	L 0 1 2 3 4 5 6 7 8

4.	Determine the absolute value of the complex number $z = a + bi$, $i^2 = -1$, such that $2iz - 6\bar{z} = -16$, where $\bar{z}$ is the conjugate of the complex number z. *Solution:* *Answer:*_____.	L 0 1 2 3 4 5 6 7 8	L 0 1 2 3 4 5 6 7 8
5.	Determine the maximum value of the expression $\frac{1}{x_1} + \frac{1}{x_2}$, where x_1 and x_2 are solutions of the equation $2x^2 - m(m+6)x - 1 = 0$. *Solution:* *Answer:*_____.	L 0 1 2 3 4 5 6 7 8	L 0 1 2 3 4 5 6 7 8

GEOMETRY			
6.	In rectangle $ABCD$, the length of side AD is 3 cm. Point F lies on side DC, such that $DF = 4$ cm. Let E be the point of intersection of straight lines AF and BC, and let $CE = 6$ cm. Determine the length of the line segment EF. *Solution:*  *Answer:* _____.	L 0 1 2 3 4 5	L 0 1 2 3 4 5
7.	The sum of the areas of the bases of a right circular cylinder is equal to its lateral surface area. Determine the volume of the cylinder, if it is known that the length of the diagonal of the axial section is equal to $\sqrt{5}$ cm. *Solution:*  *Answer:* _____.	L 0 1 2 3 4 5	L 0 1 2 3 4 5
8.	Consider the isosceles trapezoid $ABCD$, where $BC \| \| AD$, $AB = CD = 4$ cm, $BC = 2\sqrt{2}$ cm, and the angle at the large base AD is 45°. Determine the length of the diagonal AC. *Solution:*  *Answer:*_____.	L 0 1 2 3 4 5 6 7 8	L 0 1 2 3 4 5 6 7 8

9.	In a regular triangular pyramid, the height is $\sqrt{6}$ cm and the edge of the base is 6 cm. Determine the lateral surface area of the pyramid. *Solution:*  *Answer:*_____.	L 0 1 2 3 4 5 6 7 8	L 0 1 2 3 4 5 6 7 8
	FUNCTIONS		
10.	Consider the function $f: \mathbb{R} \to \mathbb{R}$, $f(x) = \left(4\sqrt{3} - 7\right)x + 1$. Determine the monotonicity of the function f. *Solution:* *Answer:* _____.	L 0 1 2 3 4 5	L 0 1 2 3 4 5

11.	Consider the functions $f:\mathbb{R}\to\mathbb{R},\ f(x)=2x-1,\quad g:D\to\mathbb{R},\ g(x)=\sqrt{1-x}$. Determine the real values of $x\in D$, for which the square of the values of the function f are less than 9. *Solution:* *Answer:* _____.	L 0 1 2 3 4 5 6 7 8	L 0 1 2 3 4 5 6 7 8
12.	In an arithmetic progression, the 10th term is twice the value of the 3rd term, and the sum of the first seven terms is equal to 280. Determine the first term of the progression. *Solution:* *Answer:*_____.	L 0 1 2 3 4 5 6 7 8	L 0 1 2 3 4 5 6 7 8

ELEMENTS OF COMBINATORICS, MATHEMATICAL STATISTICS, FINANCIAL CALCULUS AND PROBABILITY THEORY			
13.	The Republic of Moldova team at the computer science competition consists of 7 students, 4 of whom can program only in C++, and 3 can program only in Python. For a test 4 students were randomly selected. Determine the probability that at least one student among them can program in Python. *Solution:* *Answer:*_____.	L 0 1 2 3 4 5 6 7 8	L 0 1 2 3 4 5 6 7 8
14.	The amount of 100 thousand lei was divided into two parts and transferred to two bank accounts. The annual interest on the first account is 8%, and on the second account – 11%. The total amount obtained for one year from both accounts was 9,8 thousand lei. Determine what amount was placed on the first account. *Solution:* *Answer:*_____.	L 0 1 2 3 4 5 6 7 8	L 0 1 2 3 4 5 6 7 8

Annex

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

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

$$\log_{a^c} b = \frac{1}{c} \log_a b\,,\ a \in \mathbb{R}_+^* \setminus \{1\},\ b \in \mathbb{R}_+^*, c \neq 0$$

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

$$\mathcal{A}_{circle} = \pi R^2$$

$$\mathcal{A}_{lat.surf.cylinder.} = 2\pi RH$$

$$\mathcal{V}_{cil.} = \pi R^2 H$$

$$\mathcal{A}_{\Delta} = \frac{1}{2} a \cdot h_a$$

$$a_n = a_1 + (n-1)r, \qquad S_n = \frac{a_1 + a_n}{2} \cdot n$$