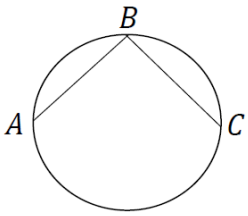
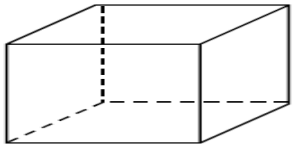
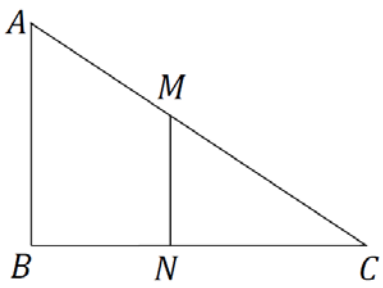
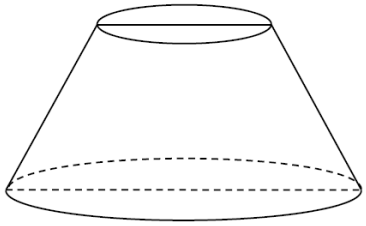
No.	Items	Score	
	ALGEBRA		
1.	Calculate: $\sqrt[3]{3 \cdot \left(\frac{\sqrt{3}}{8}\right)^{-2}}$. *Solution:* *Answer:*_____.	L 0 1 2 3 4 5	L 0 1 2 3 4 5
2.	Determine the value of the expression: $2^{\log_4 36} - \log_5 \frac{1}{25}$. *Solution:* *Answer:*_____.	L 0 1 2 3 4 5 6 7 8	L 0 1 2 3 4 5 6 7 8
3.	Solve in the set $\mathbb{C}$ the equation $\begin{vmatrix} z & 5 \\ -2 & z-2 \end{vmatrix} = 0$ and determine the absolute value of the difference of the obtained solutions. *Solution:* *Answer:*_____.	L 0 1 2 3 4 5 6 7 8	L 0 1 2 3 4 5 6 7 8
4.	A bowl contains 15 liters of a salt solution with a concentration of 5%. Determine how many liters of water must be poured in the bowl, to get a salt solution with a concentration of 3%. *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 smallest integer value of a, so that the equation $x^2 + (a-8)x + a^2 + 16 = 0$ has two distinct real solutions. *Solution:* *Answer:*_____.	L 0 1 2 3 4 5 6 7 8	L 0 1 2 3 4 5 6 7 8
	GEOMETRY		
6.	Chords AB and BC of a circle are perpendicular to each other and have the length of $4\sqrt{2}$ cm. Determine the length of the circle.  *Solution:* *Answer:*_____.	L 0 1 2 3 4 5	L 0 1 2 3 4 5
7.	Determine the total surface area of a rectangular parallelepiped with the dimensions 1 cm, 2 cm and 3 cm.  *Solution:* *Answer:*_____.	L 0 1 2 3 4 5	L 0 1 2 3 4 5

8.	Consider the right-angled triangle ABC where $m(\angle ABC) = 90°$, $AB = 9$ cm, $AC = 15$ cm. On the sides AC and BC the points M and N are respectively taken, so that $MN \parallel AB$ and $BN:NC = 1:2$. Determine the area of the trapezoid $ABNM$. *Solution:* *Answer:*_____.		L 0 1 2 3 4 5 6 7 8	L 0 1 2 3 4 5 6 7 8
9.	A frustum of a right circular cone has the radius of the bases of 1 cm and 4 cm. Determine the measure of the angle between the slant height and the large base, if it is known that the volume of the frustum is equal to $21\sqrt{3}\pi$ cm^3. *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 $f:\mathbb{R}\to\mathbb{R},\ f(x)=-6x+2$. Determine the real values of x, for which $f(x)>f(3)$. *Solution:* *Answer:* $x\in$_____.	L 0 1 2 3 4 5	L 0 1 2 3 4 5
11.	Consider the functions $f:\mathbb{R}\to\mathbb{R},\ f(x)=-x^2+4x-7$, and $g:\mathbb{R}^*\to\mathbb{R}$, $g(x)=-\frac{6}{x}$. Show that the vertex of the parabola, representing the graph of the function f, lies on the graph of the function g. *Solution:*	L 0 1 2 3 4 5 6 7 8	L 0 1 2 3 4 5 6 7 8
12.	The numbers a, b and c are consecutive terms of an arithmetic progression. Determine the numbers, if it is known that their sum is equal to 60 and $\frac{b}{a}=\frac{5}{4}$. *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 STATISTCS, FINANCIAL CALCULUS AND PROBABILITY THEORY			
13.	A die is thrown 3 times. Determine the probability that the sum of the appearing numbers is equal to 17. *Solution:* *Answer:*_____.	L 0 1 2 3 4 5 6 7 8	L 0 1 2 3 4 5 6 7 8
14.	The blood glucose levels of a group of patients are as follows: 97, 103, 105, 98, 101, 98, 101, 103, 104, 104. Determine the arithmetic mean and the median of the corresponding statistical series. *Solution:* *Answer:*_____.	L 0 1 2 3 4 5 6 7 8	L 0 1 2 3 4 5 6 7 8

Annex

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

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

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

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

$$\mathcal{A}_{trapezoid} = \frac{1}{2}(a+b)h$$

$$\mathcal{V}_{frustum\ of\ a\ cone} = \frac{1}{3}\pi h(r^2 + R^2 + rR)$$

$$a_n = a_1 + (n-1)r$$

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