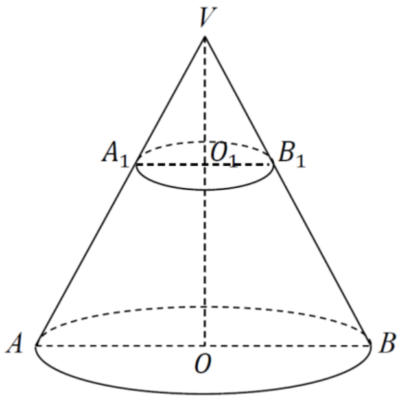
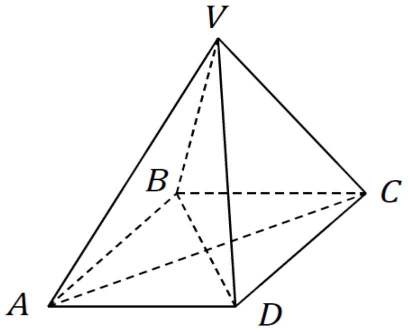
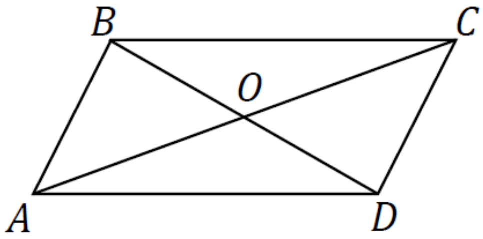
No.	Items	Score	
1.	Fill in the boxes with two consecutive integers, so that the statement becomes true. $\square < \sqrt[3]{-17} < \square$.	L 0 1 2	L 0 1 2
2.	Consider the function $f\colon \left[0; \frac{\pi}{2}\right] \to \mathbb{R}, f(x) = \cos x$. Fill in the box with one of the expressions "*monotonically decreasing*" or "*monotonically increasing*", so that the statement becomes true. "The function f is $\square$."	L 0 2	L 0 2
3.	On the picture the right circular cone with the altitude $VO = 6$ cm is represented. The cone is cut by a plane parallel to the base at the distance of 2 cm from the vertex V. Write in the box the length of the radius of the circle from the cross-section, if it is known that the length of the radius from the base is equal to 15 cm.  $O_1B_1 = \square$ cm.	L 0 2	L 0 2
4.	Calculate the value of the expression $\log_2 5 + 2\log_{\frac{1}{4}} 20 + 32^{\frac{1}{5}}$. *Solution:* *Answer:*____________________________.	L 0 1 2 3 4	L 0 1 2 3 4
5.	Consider $z = \frac{(3+i)^2}{2i}$, where $i^2 = -1$. Determine $\bar{z}$. *Solution:* *Answer:*____________________________.	L 0 1 2 3 4 5	L 0 1 2 3 4 5

6.	Solve in the set $\mathbb{R}$ the inequality $\left(\frac{64}{27}\right)^{x-4} \geq \left(\frac{9}{16}\right)^{6+x}$. *Solution:* *Answer:*____.	L 0 1 2 3 4 5	L 0 1 2 3 4 5
7.	Consider the regular square pyramid $VABCD$, where VAC is a right-angled triangle with the legs of 6 cm. Determine the volume of the pyramid.  *Solution:* *Answer:*____.	L 0 1 2 3 4 5 6	L 0 1 2 3 4 5 6

8.	Consider the function $f: (0;\ +\infty) \to \mathbb{R},\ f(x) = \ln x + \frac{1}{x}$. Determine the intervals of monotonicity of the function f. *Solution:* *Answer:* ____.	L 0 1 2 3 4 5 6	L 0 1 2 3 4 5 6
9.	In a jar there are 5 white, 4 red and one black balls. Five balls are taken at random. Determine the probability that balls of all three colors are taken. *Solution:* *Answer:*____.	L 0 1 2 3 4 5	L 0 1 2 3 4 5

10.	Consider the parallelogram $ABCD$, where $AB = 13$ cm, $BD = 16$ cm and O is the point of intersection of the diagonals. Determine the perimeter of the parallelogram $ABCD$, if $\mathrm{m}(\angle AOB) = 60°$. *Solution:*  *Answer:*____.	L 0 1 2 3 4 5 6	L 0 1 2 3 4 5 6

11.	Consider the functions $f, g: [0;\ +\infty) \to \mathbb{R},\ f(x) = \sqrt{x},\ g(x) = 2 - x$. Determine the numerical value of the area of the region bounded by the graphs of the functions f and g, and by the Oy – axis. *Solution:* *Answer:*____.	L 0 1 2 3 4 5 6	L 0 1 2 3 4 5 6
12.	Determine the real values of a, such that the equation $\lvert x^2 + 3a - 2 \rvert = a$ has 3 real solutions. *Solution:* *Answer:*____.	L 0 1 2 3 4 5 6	L 0 1 2 3 4 5 6

Annex

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

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

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

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

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

$$(x^\alpha)' = \alpha\, x^{\alpha-1}, \qquad \alpha \in \mathbb{R}$$

$$(\ln x)' = \frac{1}{x}$$

$$\int x^\alpha dx = \frac{x^{\alpha+1}}{\alpha+1} + C, \qquad \alpha \in \mathbb{R} \setminus \{-1\}$$

$$c^2 = a^2 + b^2 - 2ab\cos\varphi$$

$$\mathcal{V}_{pyramid} = \frac{1}{3}\mathcal{A}_b \cdot H$$