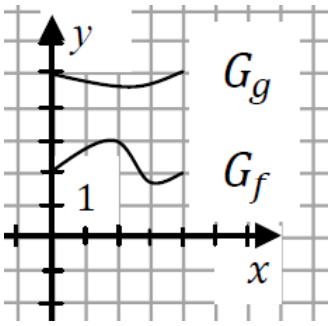
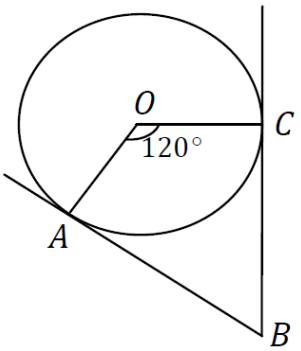
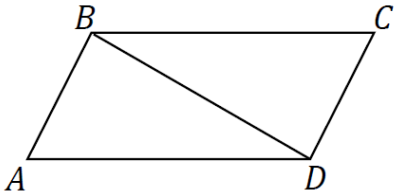
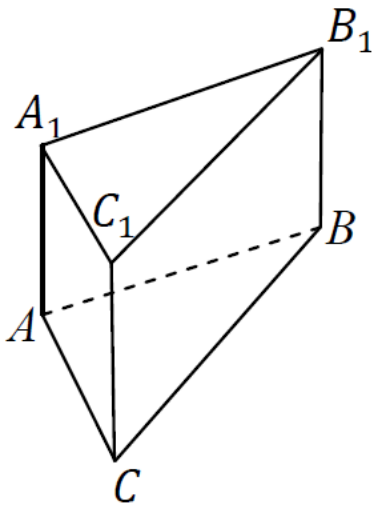
No.	Items	Score	
1.	Using the picture, fill in the box with one of the symbols “<”, “>” or “=” so that the statement becomes true. $\sqrt[3]{5}$ ☐ $\sqrt[4]{5}$.	L 0 2	L 0 2
2.	On the picture, the graphs of the continuous functions $f, g: [0; 4] \to \mathbb{R}$ are represented. Using the picture, fill in the box with one of the symbols “<”, “>” or “=” so that the statement becomes true. $\int_0^4 (f(x) - g(x))dx$ ☐ 0. 	L 0 2	L 0 2
3.	On the picture the straight lines BA and BC are tangent to the circle with the center O at the points A and C, respectively. Write in the box the degree measure of the angle ABC, if it is known that $m(\angle AOC) = 120°$. $m(\angle ABC) =$ ☐. 	L 0 2	L 0 2
4.	Calculate the value of the expression $7^{\log_{49} 3} \cdot 3^{-\frac{1}{2}}$. *Solution:* *Answer:*_____.	L 0 1 2 3 4	L 0 1 2 3 4
5.	Consider $z = \frac{5+3i}{1+i} - 2i$, where $i^2 = -1$. Determine the absolute value of the complex number 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 $\sqrt{1-x} < \sqrt{2x+4}$. *Solution:* *Answer:*_____.	L 0 1 2 3 4 5	L 0 1 2 3 4 5
7.	Consider the parallelogram $ABCD$, where $m(\angle A) = 60°$, $AB = 4$ cm, $BD = 2\sqrt{7}$ cm. Determine the area of the parallelogram $ABCD$.  *Solution:* *Answer:*_____.	L 0 1 2 3 4 5 6	L 0 1 2 3 4 5 6

8.	Consider the function $f:\left(\frac{2}{3};+\infty\right)\to\mathbb{R},\ f(x)=\frac{1}{3x-2}-1.$ Determine the antiderivative F of the function f, so that $x=1$ is the abscissa of the point of intersection of the graphs of the functions f and F. *Solution:* *Answer:* $F:\left(\frac{2}{3};+\infty\right)\to\mathbb{R}, F(x)=$ _____.	L 0 1 2 3 4 5 6	L 0 1 2 3 4 5 6
9.	Four dice are rolled simultaneously. Determine probability of rolling a sum of 22. *Solution:* *Answer:*_____.	L 0 1 2 3 4 5	L 0 1 2 3 4 5

10.	The base of the right prism $ABCA_1B_1C_1$ is the triangle ABC, where $m(\angle A) = 90°$, $AB = 15$ cm, $AC = 20$ cm. Determine the distance between the vertex A_1 and the edge BC, if the volume of the prism is equal to 750 cm^3. *Solution:*  *Answer:*_____.	L 0 1 2 3 4 5 6	L 0 1 2 3 4 5 6

11.	Consider the expression $E(x) = 2\sin(2x)\,\mathrm{tg}\,x$. Determine the real values of x for which $E(x) \neq 1$. *Solution:* *Answer:*_____.	L 0 1 2 3 4 5 6	L 0 1 2 3 4 5 6
12.	Consider the function $f: \mathbb{R} \to \mathbb{R},\ f(x) = m(x-1)e^x - \frac{x^2}{2}$. Determine the real values of m, for which the function f has a unique critical point. *Solution:* *Answer:*_____.	L 0 1 2 3 4 5 6	L 0 1 2 3 4 5 6

Annex

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

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

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

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

$$(e^x)' = e^x$$

$$(f \cdot g)' = f' \cdot g + f \cdot g'$$

$$\int \frac{1}{x} dx = \ln|x| + C$$

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

$$\sin(2\alpha) = 2 \sin\alpha \cos\alpha$$

$$\sin^2\alpha = \frac{1 - \cos(2\alpha)}{2}$$

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

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

$$\mathcal{A}_{\text{parallelogram}} = a \cdot h_a$$