8. Stereometry

Task 8.1. (T 17.2015, 0 – 4 pts)

The lateral surface of a cylinder unfolds into a square with an area of 72π . Complete the following sentences.

a) The height of the cylinder is ..... .
b) The radius of the cylinder's base is ..... .
c) The area of the axial cross-section of the cylinder is ..... .
d) The volume of the cylinder is ..... .

Task 8.2. (T 13.2016)

In a right tetragonal prism, the length of the base edge is 8 cm. The length of the diagonal in this prism is 18 cm. The sum of all side edges of this prism equals

A. 56 cm **B.** $2\sqrt{65}$ cm **C.** 14 cm **D.** $8\sqrt{65}$ cm

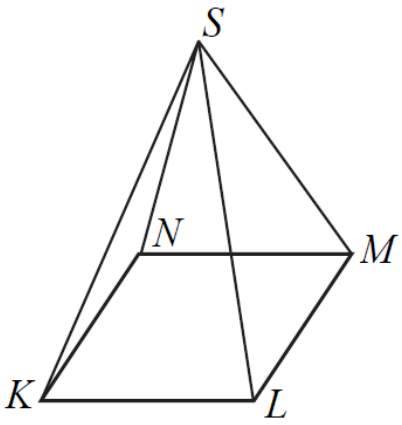
Task 8.3. (T 15.2016, 0 – 2 pts)

The axial cross-section of a cone is an equilateral triangle with an area of $49\sqrt{3}$. Complete the following sentences.

a) The area of the cone's base equals ..... .
b) The volume of the cone equals ..... .

Task 8.4. (T 12.2017)

The base of a right quadrangular pyramid $KLMNS$ is the square $KLMN$ (see the illustration).



The angle between the lateral edge and the base of the pyramid is:

A. $\angle KLN$ **B.** $\angle KLM$ **C.** $\angle LMS$ **D.** $\angle KMS$

Task 8.5. (T 17.2017, 0 – 2 pts)

The radius of a base of cylinder is 10. The axial cross-section of the cylinder is a square. Complete the following sentences.

a) The total surface area of the cylinder is …… .
b) The volume of the cylinder is …… .

Task 8.6. (T 12.2018)

The base of a pyramid is a rectangle, and one of the side edges of this pyramid is perpendicular to the base. The number of faces of this pyramid which are right-angled triangles is

A. 2 **B.** 1 **C.** 4 **D.** 3

Task 8.7 (T 18.2018, 0 – 4 pts)

The height of a regular quadrilateral prism is 2 units larger than the edge of the base of the prism, while the sum of the length of all edges of the prism is 92 . Complete the following sentences.

a) The height of the prism is …… .
b) The volume of the prism is …… .
c) The length of the diagonal of the prism is …… .
d) If α is the angle between the diagonal of the prism and its base, then the cosine of the angle α is …… .

Task 8.8 (T 10.2019)

The angle at the vertex of a cone is a right angle, and the height of the cone equals 10. The lateral surface area of the cone is:

A. $100\pi\sqrt{3}$ **B.** $100\pi\left(\sqrt{2}+1\right)$ **C.** 100π **D.** $100\pi\sqrt{2}$

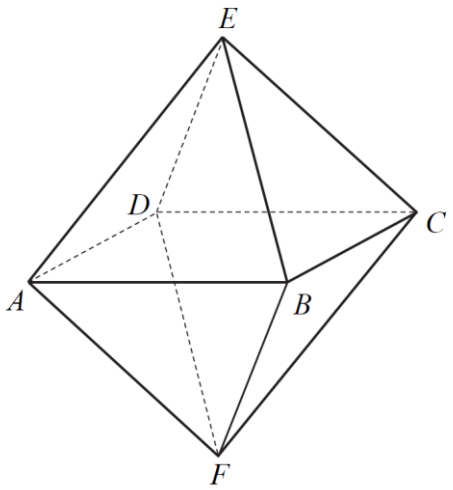
Task 8.9 (T 15.2020)

In a square based prism, the base edge length is 2, and the height of the prism is $2\sqrt{6}$. The angle between the diagonal of this prism and its base is:

A. 30° **B.** 45° **C.** 60° **D.** 75°

Task 8.10 (T 21.2020, 0 – 3 pts)

Two square based pyramids *ABCDE* and *ABCDF* have the same base *ABCD* (refer to the figure below). All the edges of the pyramids have the same length of 10 cm.



Complete the following sentences.

a) The distance *EF* between the vertices of the pyramids equals …… .

b) The volume of the obtained solid is …… .

c) The surface area of the obtained solid is …… .

Task 8.11 (T 13.2021)

A prism has 8 faces. The total number of body diagonals of this prism is equal to

A. 20 **B.** 16 **C.** 18 **D.** 40

Task 8.12 (T 14.2021)

In a regular square pyramid, the ratio of the total surface area to the lateral surface area equals $9 : 5$. Then the ratio of the length of the base edge of this pyramid to the slant height of the pyramid is equal to

A. $2:5$ **B.** $4:5$ **C.** $3:\sqrt{5}$ **D.** $8:5$

Task 8.13. (T. 14.023)

The base of the right square based pyramid $ABCDS$ is the square $ABCD$.
The edges AB and AS of this pyramid have lengths: $|AB| = 10$ and $|AS| = \sqrt{194}$.

Complete the following sentences so that they are true.

1. The area of the lateral face of this pyramid is equal to ..... .
2. The sine of the angle between the side edge and the diagonal of the base (joining at the same vertex) is equal to ..... .

Task 8.14 (T 12.2024)

A right prism $ABCDEFGH$ has the bases $ABCD$ and $EFGH$, and the lateral edges AE, BF, CG, and DH. The base $ABCD$ is a rectangle whose sides AB and BC are 18 and 24, respectively. The length of the diagonal BH of this prism is 78.

Complete the sentences so that they are true. Write the correct numbers in the blanks.

1. The length of the longest edge of this prism is equal to ..... .
2. The ratio of the lateral surface area of the prism to the total surface area of this prism is equal to ..... .