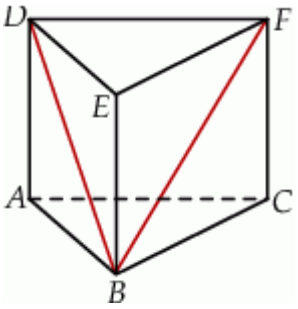
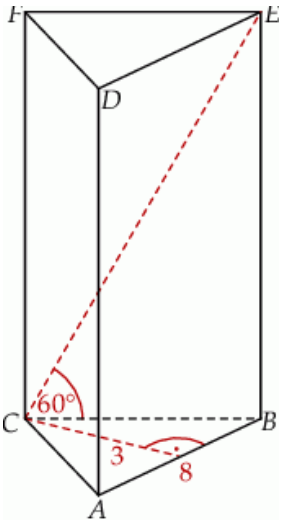
Prisms

1. Calculate the volume and surface area of a right prism base of which is a rhombus with diagonals of lengths 6 cm, 8 cm respectively, and the angle between the diagonal of the lateral face and the edge of the base is equal to 45°

2. The base of a right prism $ABCDEF$ is a triangle ABC , in which $|\angle ABC| = 120°$ and $|AB| = 2$ (see the figure). The triangle BDF is equilateral. Calculate the total surface area of the prism.



3. An isosceles triangle ABC is the base of a right prism $ABCDEF$. $|AC| = |BC|$, $|AB| = 8$. The altitude of triangle ABC from vertex C is equal to 3. The angle between the diagonal CE and the edge CB is 60°. (see the figure). Calculate the total surface area and volume of this prism.



4. An isosceles right triangle is the base of a right prism. The angle between the diagonals of two perpendicular lateral faces, led the same vertex, measures 60°. Knowing that the volume of this prism is 32 cm^3, calculate the total surface area of this solid.

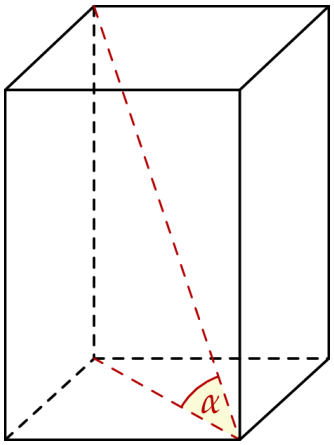
5. Calculate the volume of a regular triangular prism in which the edge of the base has length 1 and the angle between the diagonal of the lateral face and the adjacent face is equal to 30°.

6. The length of every edge in a regular hexagonal prism is equal to 6. Calculate the cosine of the angle between the longer diagonal of the solid and base of the prism.

7. Given a regular triangular prism $ABCDEF$. The height of the base ABC is equal to $2\sqrt{3}$. The diagonal AE of the lateral face $ABED$ forms with the edge AB the 60° angle. Calculate the volume and total surface area of this prism.

8. In a regular quadrangular prism, the diagonal of length 5 is inclined to the plane of the base at an angle such that $\sin\alpha = 0.2$. Calculate the volume of this prism.

9. In a regular quadrangular prism with a volume of 108, the ratio of the length of the base edge to the height of the prism is equal to 1:4. The diagonal of this prism is inclined to the plane of the base at an angle α (see the figure). Calculate the cosine of the angle α and the total surface area of this prism.



10. The diagonal of a regular quadrangular prism with a length of 10 cm is inclined to the plane of the base at the angle that measure is equal to 30°. Calculate the volume of this prism.

11. An isosceles right triangle with legs of length 9 is the base of a right prism. The angle between the diagonal of the largest lateral face and the height of the prism is equal to 60°. Calculate the lateral surface area and volume of this prism.

12. The lengths of all edges in a regular hexagonal prism are equal. Calculate the volume of the prism if its total surface area is equal to $48\sqrt{3} + 96$.

Answers:

1. $V = 120\ \text{cm}^3,\ P_c = 148\ \text{cm}^2$
2. $2\sqrt{3} + 8\sqrt{2} + 4\sqrt{6}$
3. $V = 60\sqrt{3}, P_b = 24 + 90\sqrt{3}$
4. $16(3 + \sqrt{2})\ \text{cm}^2$
5. $\frac{\sqrt{6}}{4}$
6. $\frac{2\sqrt{5}}{5}$
7. $V = 48,\ P_c = 56\sqrt{3}$
8. 12
9. $\cos\alpha = \frac{1}{3}, P_c = 162$
10. $V = \frac{375}{2}\ \text{cm}^3$
11. $V = \frac{243}{2}\sqrt{6}, P_b = 54(\sqrt{6} + \sqrt{3})$
12. $V = 96\sqrt{3}$