

Volume of Rectangular Prisms

Geometry · Grade 5

Score: _____ / 10

★ Hard · 10 Questions

Solve each problem. Show your work in the space provided. Write your answer on the line.

1. A cube is cut in half along a diagonal plane. What is the volume of each piece if the cube has side 10 cm?

Answer: _____

2. A cylindrical tank with diameter 3 m and height 4 m is $\frac{2}{3}$ full of water. How many m^3 of water is in it? ($\pi \approx 3.14$)

Answer: _____

3. A triangular pyramid has base area 36 cm^2 and height 9 cm. Find its volume.

Answer: _____

4. A square pyramid has base side 10 cm and slant height 13 cm. Find the volume.

Answer: _____

5. A box manufacturer wants to double the volume of a cube by increasing only the height. If the cube has side 6 cm, what must the new height be?

Answer: _____

6. A rectangular prism's length and width are both 6 cm, and height is 4 cm. It is melted and recast as a cube. Find the cube's side length.

Answer: _____

7. A rectangular box has volume 480 cm^3 . Two dimensions are 8 cm and 6 cm. What is the third?

Answer: _____

8. Find the volume of an L-shape made of two prisms: $6 \times 4 \times 3 \text{ cm}$ and $4 \times 4 \times 3 \text{ cm}$.

Answer: _____

9. A tank holds $1,800 \text{ cm}^3$ of water. It is filled to $\frac{3}{4}$. What is the tank's full volume?

Answer: _____

10. A pool $12 \text{ m} \times 5 \text{ m} \times 2 \text{ m}$ is filled at 60 m^3 per hour. How many hours to fill?

Answer: _____

Answer Key

Volume of Rectangular Prisms — Hard

1. **500 cm³**

Cube volume = $10^3 = 1,000 \text{ cm}^3$. Each half = 500 cm^3 .

2. **18.84 m³**

Full: $3.14 \times 2.25 \times 4 = 28.26 \text{ m}^3$. $\frac{2}{3}$ full: $(\frac{2}{3}) \times 28.26 = 18.84 \text{ m}^3$.

3. **108 cm³**

$V = (\frac{1}{3}) \times \text{Base Area} \times \text{height} = (\frac{1}{3}) \times 36 \times 9 = 108 \text{ cm}^3$.

4. **400 cm³**

Height: $h^2 + 5^2 = 13^2$. $h^2 = 144$. $h = 12$. $V = (\frac{1}{3}) \times 100 \times 12 = 400 \text{ cm}^3$.

5. **12 cm**

Original $V = 216 \text{ cm}^3$. Double = 432. $6 \times 6 \times h = 432$. $36h = 432$. $h = 12 \text{ cm}$.

6. **$\approx 5.24 \text{ cm}$**

Prism $V = 6 \times 6 \times 4 = 144 \text{ cm}^3$. Cube: $s^3 = 144$. $s = \sqrt[3]{144} \approx 5.24 \text{ cm}$.

7. **10 cm**

$8 \times 6 = 48 \text{ cm}^2$. $480 \div 48 = 10 \text{ cm}$.

8. **120 cm³**

First prism: $6 \times 4 \times 3 = 72$. Second: $4 \times 4 \times 3 = 48$. Total: $72 + 48 = 120 \text{ cm}^3$.

9. **2,400 cm³**

If 1,800 is $\frac{3}{4}$, then full = $1,800 \times \frac{4}{3} = 2,400 \text{ cm}^3$.

10. **2 hours**

$V = 12 \times 5 \times 2 = 120 \text{ m}^3$. $120 \div 60 = 2 \text{ hours}$.