

Chapter 3: Volume

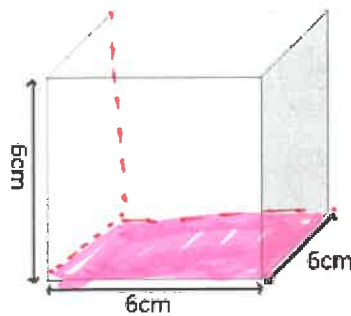
Section 3.2 - Volume of Prisms

Volume of prisms = area of BASE x HEIGHT

Volume of rectangular prisms and cubes

Example

Key Points



$$V = (l \times w) \times h$$

$$V = (6\text{ cm} \times 6\text{ cm}) \times 6\text{ cm}$$

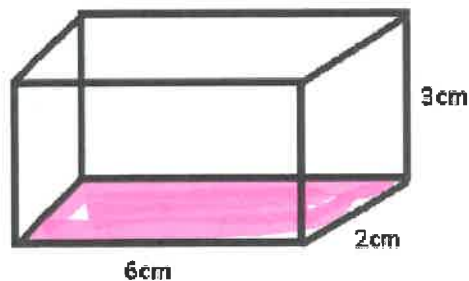
$$V = (36\text{ cm}^2) \times 6\text{ cm}$$

$$V = 216\text{ cm}^3$$

- Volume (V) is the area of the base multiplied by the height.

$$V = (l \times w) \times h$$

l x w = base area.



$$V = (l \times w) \times h$$

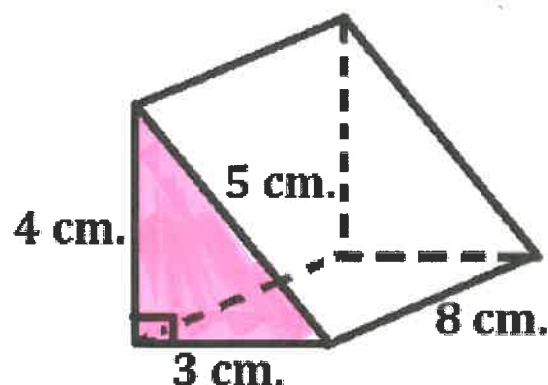
$$V = (6\text{ cm} \times 2\text{ cm}) \times 3\text{ cm}$$

$$V = (12\text{ cm}^2) \times 3\text{ cm}$$

$$V = 36\text{ cm}^3$$

Volume of triangular prisms

Example



Key Points

- Volume (V) is the area of the base (triangle) multiplied by the height or length of the prism.

$$V = \left(\frac{b \times h}{2} \right) \times l$$

$$\begin{aligned} b &= 3\text{ cm} \\ h &= 4\text{ cm} \\ L &= 8\text{ cm} \end{aligned}$$

$$V = \left(\frac{3\text{ cm} \times 4\text{ cm}}{2} \right) \times 8\text{ cm}$$

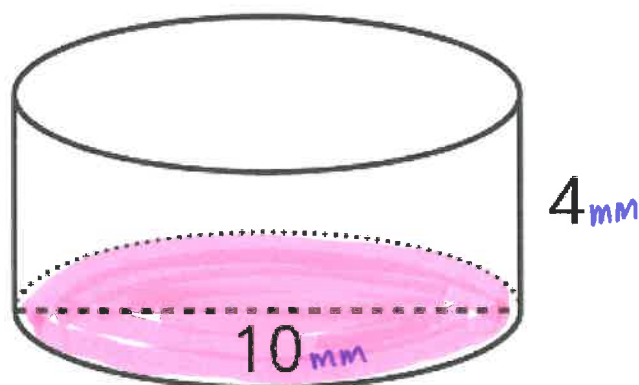
$$V = \left(\frac{12\text{ cm}^2}{2} \right) \times 8\text{ cm}$$

$$V = (6\text{ cm}^2) \times 8\text{ cm}$$

$$V = 48\text{ cm}^3$$

Volume of cylinders

Example



Key Points

- Volume (V) is the area of the base (circle) multiplied by the height or length of the cylinder.

$$V = (\pi \times r^2) \times h$$

$$\begin{aligned} d &= 10\text{ mm} \\ r &= 5\text{ mm} \\ h &= 4\text{ mm} \end{aligned}$$

$$V = (\pi \times (5\text{ cm})^2) \times 4\text{ cm}$$

$$V = (\pi \times 25\text{ cm}^2) \times 4\text{ cm}$$

$$V = 78.54\text{ cm}^2 \times 4\text{ cm}$$

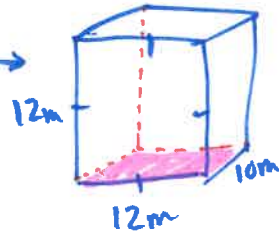
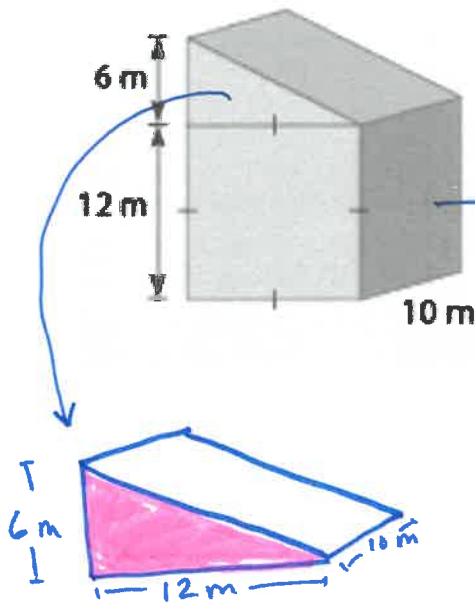
$$V = 314.16\text{ cm}^3$$

Volume of composite 3D objects

Example

Key Points

- Redraw the object as separate prisms
- Find the volume of each prism that makes up the composite object and add their volumes.



$$\begin{aligned} L &= 10\text{ m} \\ W &= 12\text{ m} \\ h &= 12\text{ m} \end{aligned}$$

$$V = (L \times W) \times h$$

$$V = (10\text{ m} \times 12\text{ m}) \times 12\text{ m}$$

$$V = 120\text{ m}^2 \times 12\text{ m}$$

$$V = 1440\text{ m}^3$$

$$\begin{aligned} b &= 12\text{ m} \\ h &= 6\text{ m} \\ L &= 10\text{ m} \end{aligned}$$

$$V = \left(\frac{b \times h}{2}\right) \times L$$

$$V = \left(\frac{12\text{ m} \times 6\text{ m}}{2}\right) \times 10\text{ m}$$

$$V = \left(\frac{72\text{ m}^2}{2}\right) \times 10\text{ m}$$

$$V = 36\text{ m}^2 \times 10\text{ m}$$

$$V = 360\text{ m}^3$$

Total Volume

V_T = Volume of rectangular prism +
Volume of triangular prism.

$$V_T = 1440\text{ m}^3 + 360\text{ m}^3$$

$$V_T = 1800\text{ m}^3$$

