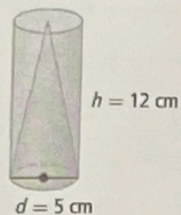


### Example 1 Calculate the Volume of a Right Cylinder and a Right Cone

- a) Calculate the volume of the right cylinder, to the nearest tenth of a cubic centimetre.
- b) Calculate the volume of the right cone, to the nearest tenth of a cubic centimetre.

$$\begin{aligned} r &= d \div 2 \\ &= 5 \div 2 \\ &= 2.5 \text{ cm} \end{aligned}$$



### Example 2 Calculate the Volume of a Right Pyramid

Many of the operating costs of a greenhouse depend on its volume. For example, the energy used to heat a building depends on the volume of the building. The two large greenhouses at the Muttart Conservatory have square bases measuring 26 m on each side. The apex of each greenhouse is 24 m high. What is the volume of each greenhouse, to the nearest cubic metre?

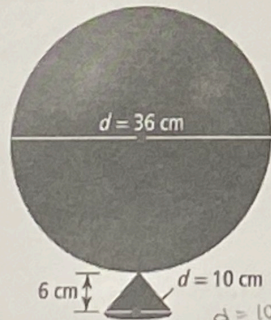
### Example 3 Calculate an Unknown Dimension When Given a Volume

The volume of an exercise ball is approximately  $4188.8 \text{ cm}^3$ . What is the diameter of this ball, in centimetres?

### Example 4 Finding the Volume of Composite Figures

Esther is creating a clay sculpture that includes a sphere attached to a right cone. What volume of clay, in cubic centimetres, does she need to make the sculpture?

$$\begin{aligned} d &= 36 \\ r &= d \div 2 \\ &= 36 \div 2 \\ &= 18 \end{aligned}$$



$$\begin{aligned} d &= 10 \\ r &= 10 \div 2 \\ &= 5 \end{aligned}$$

## 2.3 Volume

1. a) Cylinder

$$V = \pi r^2 h$$

$$\begin{aligned} V &= \pi (2.5)^2 (12) \\ &= 235.6 \text{ cm}^3 \end{aligned}$$

b) Cone

$$V = \frac{1}{3} \pi r^2 h$$

$$\begin{aligned} &= \frac{1}{3} \pi (2.5)^2 (12) \\ &= 78.5 \text{ cm}^3 \end{aligned}$$

2.  $V = \frac{1}{3} lwh$

$$\begin{aligned} &= \frac{1}{3} \cdot 26 \cdot 26 \cdot 24 \\ &= 5408 \text{ m}^3 \end{aligned}$$

3.  $V = \frac{4}{3} \pi r^3$

$$3 \left[ 4188.8 = \frac{4}{3} \pi r^3 \right]^3$$

$$\frac{12566.4}{4\pi} = \frac{4\pi r^3}{4\pi}$$

$$\sqrt[3]{1000.0} = \sqrt[3]{r^3}$$

$$10.0 = r$$

$$d = 2 \times r$$

$$= 2 \times 10.0$$

$$= 20.0 \text{ cm}$$

4. Volume Sphere + Volume Cone

$$= \frac{4}{3} \pi r^3 + \frac{1}{3} \pi r^2 h$$

$$= \frac{4}{3} \pi 18^3 + \frac{1}{3} \pi 5^2 \times 6$$

$$= 24429.0 + 157.1$$

$$= 24586 \text{ cm}^3$$

