

Similar Figures Homework

22. The areas of two mathematically similar shapes are in the ratio 49 : 81



The length of the smaller shape is 24.5cm

Work out the length of the larger shape.

$$\text{Area } 49 : 81$$

$$\text{Length } \sqrt{49} : \sqrt{81} = 7 : 9$$

$$\text{Larger length} = 24.5 \times \frac{9}{7} = 31.5 \text{cm} \dots\dots 31.5 \text{cm} \quad (3)$$

23. The volumes of two mathematically similar solids are in the ratio 8 : 125



The surface area of the smaller solid is 24 cm²

Work out the surface area of the larger solid.

$$\text{Vol } 8 : 125$$

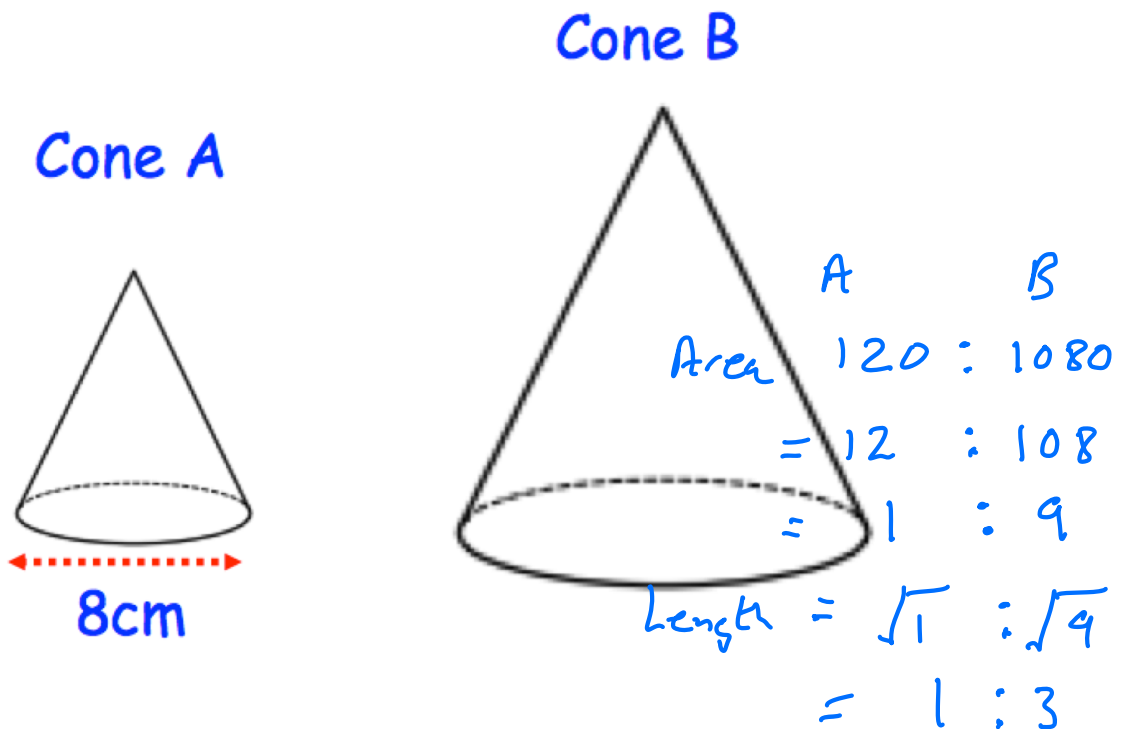
$$\begin{aligned} \text{Length } \sqrt[3]{8} : \sqrt[3]{125} \\ = 2 : 5 \end{aligned}$$

$$\begin{aligned} \text{Area } 2^2 : 5^2 \\ = 4 : 25 \end{aligned}$$

$$\dots\dots 150 \text{cm}^2 \quad (3)$$

$$\text{Larger Area} = 24 \times \frac{25}{4} = 150 \text{cm}^2$$

13.



Cone A and cone B are mathematically similar.
 The total surface area of cone A is 120cm^2
 The total surface area of cone B is 1080cm^2
 The diameter of cone A is 8cm.

Diameter B

$$= 8 \times \frac{3}{1} = 24\text{cm}$$

Work out the diameter of cone B.

12. A swimming pool has surface area 300m^2
 The swimming pool is a prism of depth 110cm.



- (a) Work out the volume of the swimming pool.
 Give your answer in m^3 .

$$300 \times 1.1 = 330\text{m}^2$$

$$\begin{array}{l} 330 \\ \text{.....m}^3 \\ (2) \end{array}$$

A scale model of the swimming pool is made.
 The depth of the model swimming pool is 5.5cm

Model?

$$\text{Area} = 300 \times \frac{1}{400}$$

- (b) Find the surface area of the model swimming pool.

Length $5.5 : 110$

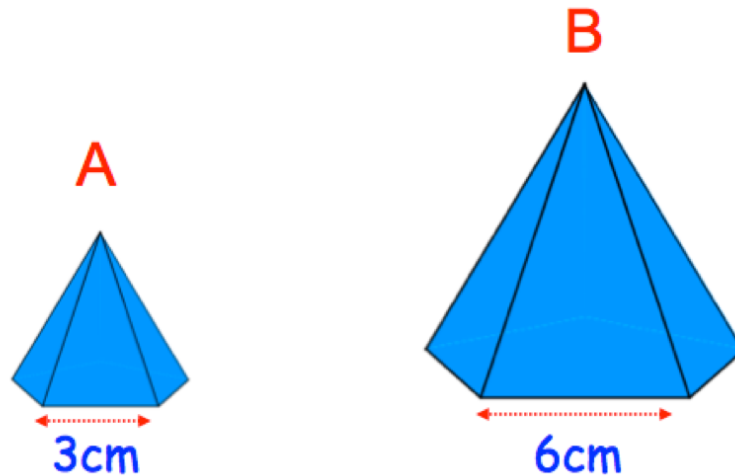
$$= 1 : 20$$

Area $1^2 : 20^2 = 1 : 400$

$$= 0.75\text{m}^2$$

$$\begin{array}{l} 0.75 \\ \text{.....m}^2 \\ (2) \end{array}$$

14. Below are two similar pyramids.



Pyramid A has a volume of 26cm^3

(a) Work out the volume of Pyramid B.

$$\begin{aligned} \text{Length } & 3:6 \\ & = 1:2 \end{aligned}$$

$$\begin{aligned} \text{Volume} & = 1^3:2^3 \\ & = 1:8 \end{aligned}$$

$$\begin{aligned} \text{Vol B} \\ & = 26 \times \frac{8}{1} = 208\text{cm}^3 \end{aligned}$$

$$\begin{aligned} & \dots\dots\dots 208 \text{cm}^3 \\ & \text{(2)} \end{aligned}$$

Pyramid B has a total surface area of 224cm^2

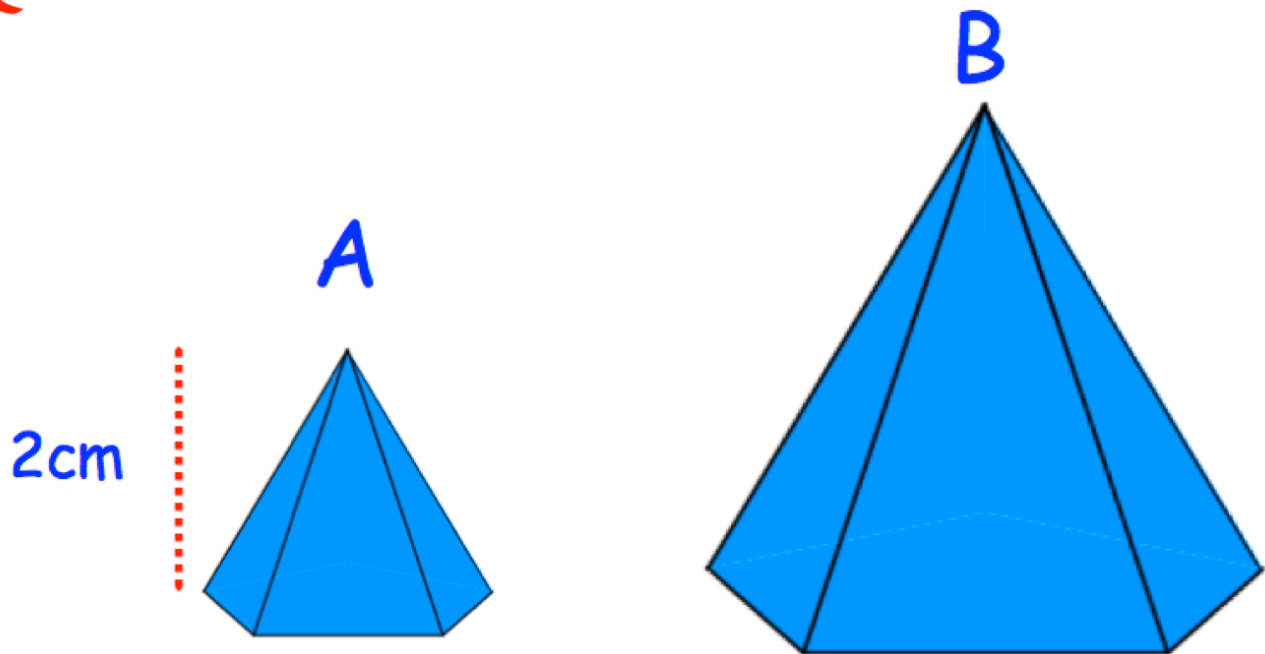
(b) Work out the total surface area of Pyramid A.

$$\begin{aligned} \text{Length } & 1:2 \\ \text{Area} & 1^2:2^2 \\ & = 1:4 \end{aligned}$$

$$\begin{aligned} \text{Area A} \\ & = 224 \times \frac{1}{4} = 56\text{cm}^2 \end{aligned}$$

$$\begin{aligned} & \dots\dots\dots 56 \text{cm}^2 \\ & \text{(2)} \end{aligned}$$

20. Two pyramids are mathematically similar.



Pyramid A has a surface area of 20cm^2
 Pyramid B has a surface area of 320cm^2
 The height of pyramid A is 2cm

(a) Work out the height of pyramid B.

$$\begin{aligned} \text{Area} &= 20 : 320 \\ &= 2 : 32 \\ &= 1 : 16 \end{aligned}$$

$$\begin{aligned} \text{Length} &= \sqrt{1} : \sqrt{16} \\ &= 1 : 4 \end{aligned}$$

$$\text{Height B} = 2 \times \frac{4}{1} = 8\text{cm}$$

.....8.....cm
 (3)

Pyramid A has a weight of 800g
 Both pyramids are made of the same material.

(b) Work out the weight of pyramid B.
 Include suitable units.

$$\begin{aligned} \text{Length} &= 1 : 4 \\ \text{Vol} &= 1^3 : 4^3 \\ &= 1 : 64 \end{aligned}$$

Weight proportional to Vol

$$\begin{aligned} \text{Weight B} &= 800 \times \frac{64}{1} \\ &= 51200\text{g} = 51.2\text{kg} \end{aligned}$$