

You may use a calculator. We recommend sketching a quick diagram for each question.

## Section A: Linear Scale Factors

- Q1** Two mathematically similar triangles have bases of length 5 cm and 10 cm, respectively. The vertical height of the smaller triangle is 3 cm. Find the vertical height of the larger triangle.
- Q2** Two similar rectangles have lengths 8 cm and 20 cm, respectively. The breadth of the larger rectangle is 15 cm. Find the breadth of the smaller rectangle.
- Q3** Rectangle A has length 16 cm and breadth 10 cm. Rectangle B has length 12 cm and breadth 7.5 cm. Are the two rectangles mathematically similar? Justify your answer.
- Q4** Triangle A has base 8 cm and vertical height 6 cm. Triangle B has base 12 cm and vertical height 10 cm. Are the two triangles mathematically similar? Justify your answer.

## Section B: Area Scale Factors

- Q5** Shapes A and B are mathematically similar. The (linear) scale factor of the enlargement from A to B is 3. The area of shape A is  $8 \text{ cm}^2$ . Calculate the area of shape B.
- Q6** Two flags are mathematically similar. The larger flag has diagonal 1.5 metres and the smaller flag has diagonal 1.2 metres. The area of the larger flag is  $2.5 \text{ m}^2$ . Find the area of the smaller flag.
- Q7** Two wall plaques are mathematically similar. Their areas are  $400 \text{ cm}^2$  and  $1024 \text{ cm}^2$ , respectively. Calculate the linear scale factor of the enlargement.
- Q8** Two rectangles have lengths 30 cm and 40 cm. Their respective areas are  $450 \text{ cm}^2$  and  $750 \text{ cm}^2$ . Are they mathematically similar? Justify your answer.

## Section C: Volume Scale Factors

- Q9** An ornament is manufactured in two mathematically similar sizes. The smaller is 10 cm high. The larger is 15 cm high. The volume of the smaller ornament is  $1800 \text{ cm}^3$ . Calculate the volume of the larger ornament.
- Q10** Two containers are mathematically similar. The larger container has height 36 cm and volume 54 litres. The smaller container has height 24 cm. Calculate the volume of the smaller container.
- Q11** Two bottles are mathematically similar. The smaller bottle has a base area of  $8 \text{ cm}^2$  and holds 150 ml. The larger bottle has a base area of  $32 \text{ cm}^2$ . Calculate how much it holds.
- Q12** Solid A has height 1.4 m and volume  $3.6 \text{ m}^3$ . Solid B has height 2.1 m and volume  $12.15 \text{ m}^3$ . Are the two solids mathematically similar? Justify your answer.