Similarity and scale

6 questions | 13 marks

Equivalent correct methods earn the corresponding marks.

1. Similar triangles have corresponding sides 8 cm and 20 cm. A second side of the smaller triangle is 12 cm. Find the matching larger side. [2 marks]

$k = \frac{20}{8} = 2.5.$

$12 \times 2.5 = 30\,\text{cm}.$

Answer: 30 cm

2. A model and real object have scale 1:50. A model length is 14 cm. Find the real length in metres. [2 marks]

$14 \times 50 = 700\,\text{cm}.$

$700\,\text{cm} = 7\,\text{m}.$

Answer: 7 m

3. Two similar shapes have length factor 1.5 from A to B. Shape A has perimeter 32 cm. Find B’s perimeter. [2 marks]

Perimeters scale by the length factor.

$32 \times 1.5 = 48\,\text{cm}.$

Answer: 48 cm

4. A triangle of area $18\,\text{cm}^2$ is enlarged with length factor 4. Find the new area. [2 marks]

The area factor is $4^2 = 16$.

$18 \times 16 = 288\,\text{cm}^2$.

Answer: $288\,\text{cm}^2$

5. Triangles PQR and XYZ are similar in that order. $PQ = 10$, $QR = 14$, $XY = 15$. Find YZ. [2 marks]

PQ matches XY, so $k = \frac{15}{10} = 1.5$.

QR matches YZ, giving $14 \times 1.5 = 21$.

Answer: 21 units

6. A student says: “The area doubled, so every side doubled.” Explain and give the actual length factor. [3 marks]

Area factor $k^2 = 2$.

Thus $k = \sqrt{2}$; doubling lengths would multiply area by 4.

Answer: The length factor is $\sqrt{2}$, approximately 1.414, not 2.