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]

$k=20/8=2.5$.

$12\times2.5=30$ 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]

$14\times50=700$ cm.

700 cm=7 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.

$32\times1.5=48$ cm.

Answer: 48 cm

4. A triangle of area 18 cm² is enlarged with length factor 4. Find the new area. [2 marks]

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

$18\times16=288$ cm².

Answer: 288 cm²

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

PQ matches XY, so $k=15/10=1.5$.

QR matches YZ, giving $14\times1.5=21$.

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.