

C4.4 Similarity

Name: _____ Class: _____ Date: _____

Total: 20 marks

KEY WORDS similar 相似 • scale factor 比例因子 • triangle 三角形 • edge 棱
 • corresponding angles 同位角

Objective

Use similarity to solve Core IGCSE Mathematics problems.

You must be able to:

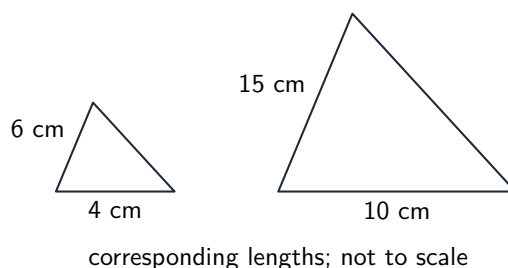
- Match corresponding vertices and lengths
- Use a length scale factor in both directions
- Check that all corresponding side ratios agree

1 Key knowledge and worked examples

■ Key knowledge: Similarity

Similar shapes have equal corresponding angles and equal ratios of corresponding lengths. Match sides in the same relative position; do not match only by appearance. Find the length scale factor $k = \text{new length}/\text{original length}$ and multiply every original length by k . In reverse, divide by k . Core similarity calculations are about lengths, not area or volume factors.

■ Worked example: Similarity



Two similar triangles have corresponding sides 4 cm and 10 cm.

- The enlargement factor is $k = 10/4 = 2.5$.
- An original side 6 cm becomes $L = kl = 2.5(6) = 15$ cm.
- A new side 20 cm corresponds to $l = L/k = 20/2.5 = 8$ cm.
- Check all corresponding side ratios are the same.

■ Method check

The scale factor acts on every length. Check corresponding sides rather than matching whichever numbers happen to be given.

2 Practice

2.1 Corresponding sides are 3 cm and 12 cm. Find the scale factor from small to large. [2]

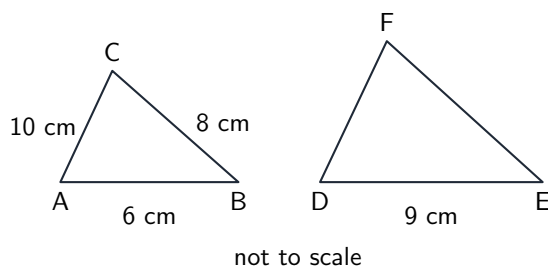
2.2 With scale factor 3, a 7 cm side becomes what length? [2]

2.3 A 24 cm side is in a larger shape of scale factor 4. Find the corresponding smaller side. [2]

2.4 Rectangles are 4×6 cm and 6×9 cm. Are they similar? Show the ratios. [2]

3 Exam-style questions

3.1 Apply the similarity methods below. Show working and include units where appropriate.

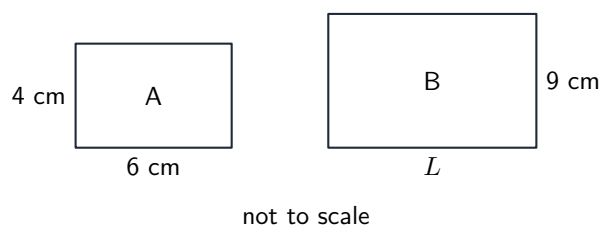


(a) Similar triangles ABC and DEF have corresponding vertices in order. $AB = 6\text{ cm}$, $BC = 8\text{ cm}$, $AC = 10\text{ cm}$ and $DE = 9\text{ cm}$. Find the scale factor. [2]

(b) Find EF and DF . [2]

(c) Find the perimeter of DEF and compare it with the perimeter of ABC . [2]

3.2 Similar rectangles A and B have corresponding shorter sides 4 cm and 9 cm. The longer side of A is 6 cm.



(a) Find the length scale factor from A to B and the longer side of B. [3]

(b) A third rectangle has sides 6 cm and 12 cm. Decide whether it is similar to A, supporting your decision with both side ratios. [3]
