SIMILAR SHAPES

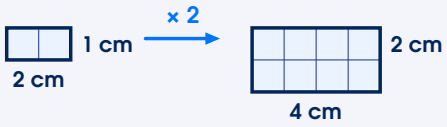
BUILDING BLOCKS

NAME _____ CLASS _____ DATE _____

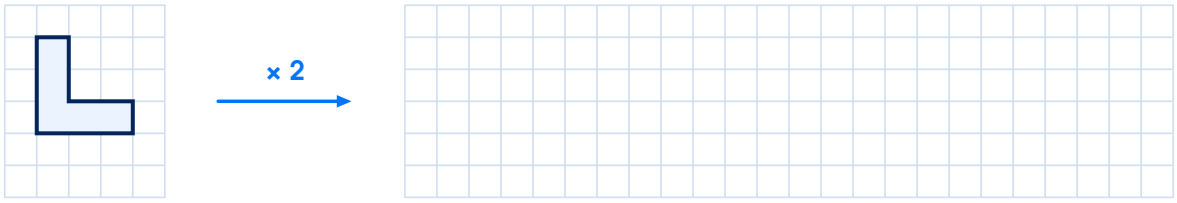
KEY IDEA

Similar shapes are the same shape but a different size.
Every side is multiplied by the same number.

Here every side is × 2: 2 cm → 4 cm, 1 cm → 2 cm



1 Draw this shape twice as big on the grid. Make every side 2 times as long.



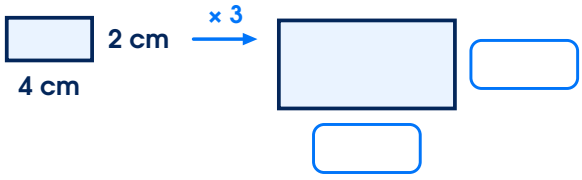
2 Use the key idea to help. Which rectangles are similar to A? Circle them.



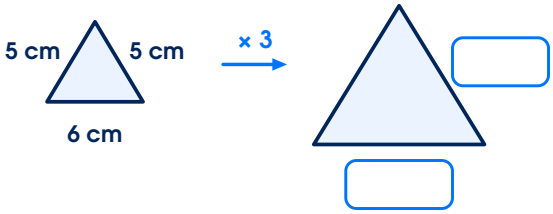
A (start) B C D

3 Every side is made 3 times as long. Write the new lengths in the boxes.

a)



b)



4 How many times as long is each side of the bigger square?



× ___ × ___ × ___

SIMILAR SHAPES

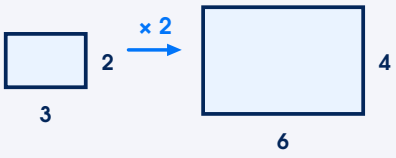
SUPPORT

NAME _____ CLASS _____ DATE _____

KEY IDEA

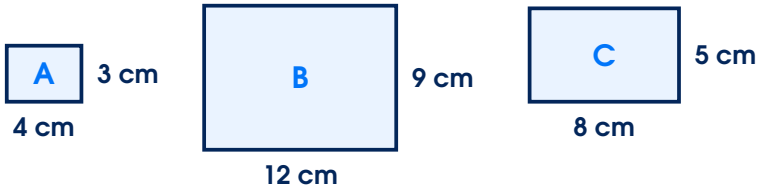
Similar shapes have equal angles and every length is multiplied by the same scale factor.

Scale factor = new length ÷ original length



1 Here are three rectangles.

Not drawn accurately



a) Scale factor from A to B: ☐

b) Is C similar to A?

YES NO

Why? .....

2 Triangles P and Q are similar. Fill in the missing lengths of Q.

Not drawn accurately



Scale factor: ☐

3 The big rectangle is made smaller to make a similar rectangle.



a) Scale factor: ☐

b) Fill in the missing width.

4 Zak says, "A 4 cm by 7 cm rectangle is similar to a 2 cm by 5 cm one."

a) Explain why Zak is wrong. .....

b) A similar rectangle has a short side of 4 cm. How long is its long side? ☐

SIMILAR SHAPES

CORE

NAME _____ CLASS _____ DATE _____

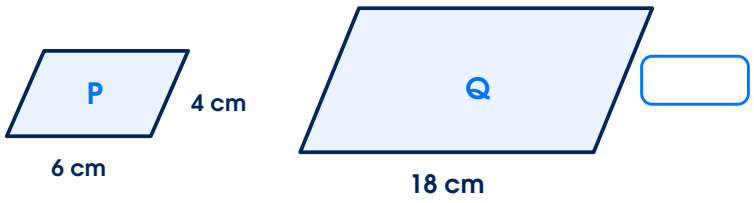
KEY IDEA

In similar shapes, corresponding angles are equal and corresponding sides are in the same ratio. Scale factor = new length ÷ corresponding original length (it can be less than 1).

FLUENCY

1 Parallelograms P and Q are similar.

Not drawn accurately



a) Scale factor: ☐

b) Fill in the box.

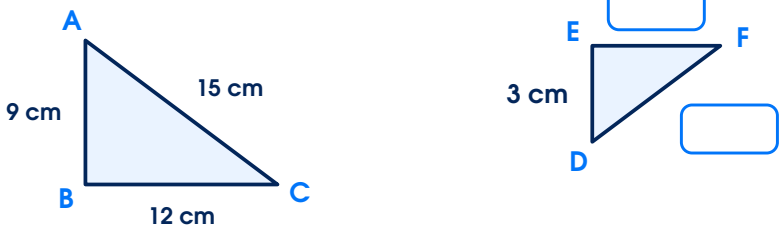
2 Are these pairs of rectangles similar? Circle YES or NO. If YES, write the scale factor.

RECTANGLE 1	RECTANGLE 2	SIMILAR?	SCALE FACTOR
4 cm by 6 cm	10 cm by 15 cm	YES NO	
5 cm by 8 cm	15 cm by 20 cm	YES NO	
1.5 cm by 4 cm	4.5 cm by 12 cm	YES NO	

REASONING

3 Triangles ABC and DEF are similar. AB corresponds to DE. Find the lengths of EF and DF.

Not drawn accurately



Scale factor: ☐

4 Explain your answers with reasons or a counter-example.

a) Are all squares similar? YES NO .....

b) Are all rectangles similar? YES NO .....

SIMILAR SHAPES

GREATER DEPTH

NAME _____ CLASS _____ DATE _____

REASONING

1 Is each statement always, sometimes or never true? Circle your answer.

If it is sometimes true, give an example of when it is true and when it is not.

a) Two squares are similar. ALWAYS SOMETIMES NEVER

b) Two rectangles are similar. ALWAYS SOMETIMES NEVER

c) Two isosceles triangles are similar. ALWAYS SOMETIMES NEVER

d) Two regular hexagons are similar. ALWAYS SOMETIMES NEVER

PROBLEM SOLVING

2 A photo is 15 cm by 10 cm. It is enlarged to make a similar photo with a perimeter of 125 cm.

Dimensions of the enlarged photo: _____

3 Rectangle A is 6 cm by 4 cm. Rectangle B is similar to A and has an area of 96 cm^2.

Dimensions of rectangle B: _____

★ CHALLENGE FOR ALL

4 A4 paper is 21 cm by 29.7 cm. Folding it in half gives A5 paper, 14.85 cm by 21 cm.

a) Show that A4 and A5 paper are (approximately) similar.

b) Find the scale factor from A5 to A4, to 2 decimal places. _____

c) Folding A3 in half makes A4. Find the size of A3. _____

SIMILAR SHAPES – ANSWERS

ANSWERS

BUILDING BLOCKS

1 An L-shape 6 squares wide and 6 squares tall, with arms 2 squares thick
2 B and D
3 Rectangle: 12 cm and 6 cm · triangle: base 18 cm, sloping sides 15 cm
4 × 3 · × 4 · × 2

SUPPORT

1 a) 3 · b) No – 8 ÷ 4 = 2 but 5 ÷ 3 is not 2
2 Scale factor 3: 24 cm, 30 cm
3 a) ½ (or 0.5) · b) 3 cm
4 a) Similar shapes need multiplying, not adding: 2 × 2 = 4, so 5 × 2 = 10 · b) 10 cm

CORE

1 a) 3 · b) 12 cm
2 Yes, 2.5 · No (3 and 2.5) · Yes, 3
3 Scale factor 3 (ABC is 3 times DEF): EF = 12 ÷ 3 = 4 cm, DF = 15 ÷ 3 = 5 cm
4 a) Yes – all angles are 90° and all four sides scale by the same factor · b) No, e.g. 1 cm by 2 cm and 1 cm by 3 cm

GREATER DEPTH

1 a) Always · b) Sometimes, e.g. 2 by 3 and 4 by 6 (true), 2 by 3 and 2 by 4 (false) · c) Sometimes (angles must match) · d) Always
2 Perimeter 50 cm → scale factor 2.5: 37.5 cm by 25 cm
3 Area of A = 24 cm², area is 4 times bigger, so scale factor 2: 12 cm by 8 cm
4 a) 29.7 ÷ 21 ≈ 1.41 and 21 ÷ 14.85 ≈ 1.41 · b) 1.41 · c) 29.7 cm by 42 cm