Foundation Check In - 9.04 Similarity

1. The triangles below are similar. Work out *x*.

2 cm

5 cm

*x*

6 cm

*p*

*q*

*p*

*q*

**Not to scale**

1. Shape **B** is an enlargement of shape **A**. Find the scale factor and centre of enlargement.



1. Shapes ABCD and A’B’C’D’ are similar. Find length A’B’.

B’

**Not to scale**

B

C

C’

16 cm

A’

D’

D

A

7.5 cm

10 cm

1. Triangle ABC is similar to triangle ADE. Work out length BC.

B

6 cm

E

3 cm

C

6 cm

A

D

**Not to scale**

1. Calculate the missing lengths in these similar shapes.

**Not to scale**

12 cm

3 cm

10 cm

9 cm

A

B

C

D

C’

B’

A’

D’

18 cm

1. Plot the following points on the coordinate grid to create triangle ABC.
* A (4, 2)
* B (8, 2)
* C (6, 8)

Enlarge the triangle using a scale factor of  about the point (-2, 0).



1. The side lengths of triangle A are 12 cm, 15 cm and 18 cm. The side lengths of triangle B are 8 cm, 10 cm and 12 cm. Show that these two triangles are similar.
2. Prove that these two triangles are similar.

12 cm

75°

7.5 cm

75°

8 cm

5 cm

**Not to scale**

1. The sides of a triangle are 5 cm, 6 cm and 10 cm. Find the length of the shortest side of a similar triangle whose longest side is 35 cm.
2. This diagram shows part of a pattern of increasing triangles.

3.2 cm

**Not to scale**

11 cm

11 cm

*x*

*y*

9.6 cm

2.2 cm

What are the values of *x* and *y*?

**Extension**

The diagram below shows two similar triangles and two similar rectangles.

Work out the lengths B’C’ and F’G’.

Work out the area for each shape and then comment on the relationship between scale factors for the lengths and areas.

A’

A

2 cm

6 cm

C

B

**Not to scale**

5 cm

C’

B’

E

E’

D’

D

2 cm

G

F

8 cm

4 cm

G’

F’

Answers

1. Scale factor is  so cm.
2. Centre of enlargement (-8, 7), scale factor 2.
3. Scale factor is  so A’B’ cm.
4. Scale factor is  so BC cm.
5. Scale factor is  so A’B’ cm, B’C’ cm and

C’D’ cm.

1. Enlarged triangle is at A’(1, 1), B’(3, 1), C’(2, 4).
2.  oe
3. The sides in the two triangles are enlarged by the same scale factor,  and . The angle in between the two sides is the same, 75°. Therefore the two triangles are similar.
4. Scale factor is  so shortest side is cm.
5. Scale factor is  therefore cm

It can be seen from the third triangle that these are isosceles triangles,
socm.

**Extension**

Length B’C’ is 15 cm (scale factor 3).

Length F’G’ is 16 cm (scale factor 4).

Areas of triangles: 5 cm2 and 45 cm2.

Areas of rectangles: 8 cm2 and 128 cm2.

There is a scale factor for the triangle areas of 9 (from 5 cm2 to 45 cm2) and for the rectangle areas of 16 (from 8 cm2 to 128 cm2). There is a relationship as the length scale factor has been squared to give the area scale factor in both shapes.

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| **Assessment Objective** | **Qu.** | **Topic** | **R** | **A** | **G** |  | **Assessment Objective** | **Qu.** | **Topic** | **R** | **A** | **G** |
| AO1 | 1 | Apply similarity to calculate an unknown length in similar triangles |  |  |  |  | AO1 | 1 | Apply similarity to calculate an unknown length in similar triangles |  |  |  |
| AO1 | 2 | Identify scale factor and centre of enlargement |  |  |  |  | AO1 | 2 | Identify scale factor and centre of enlargement |  |  |  |
| AO1 | 3 | Apply similarity to calculate an unknown length in similar shapes |  |  |  |  | AO1 | 3 | Apply similarity to calculate an unknown length in similar shapes |  |  |  |
| AO1 | 4 | Apply similarity to calculate an unknown length in similar triangles |  |  |  |  | AO1 | 4 | Apply similarity to calculate an unknown length in similar triangles |  |  |  |
| AO1 | 5 | Apply similarity to calculate an unknown length in similar shapes |  |  |  |  | AO1 | 5 | Apply similarity to calculate an unknown length in similar shapes |  |  |  |
| AO2 | 6 | Carry out enlargement with a fractional scale factor |  |  |  |  | AO2 | 6 | Carry out enlargement with a fractional scale factor |  |  |  |
| AO2 | 7 | Apply similarity to calculate an unknown length in similar triangles |  |  |  |  | AO2 | 7 | Apply similarity to calculate an unknown length in similar triangles |  |  |  |
| AO2 | 8 | Prove that two triangles are similar |  |  |  |  | AO2 | 8 | Prove that two triangles are similar |  |  |  |
| AO3 | 9 | Apply similarity to calculate an unknown length in similar triangles |  |  |  |  | AO3 | 9 | Apply similarity to calculate an unknown length in similar triangles |  |  |  |
| AO3 | 10 | Identify lengths in an enlargement problem |  |  |  |  | AO3 | 10 | Identify lengths in an enlargement problem |  |  |  |
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