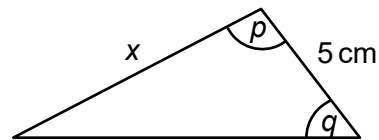
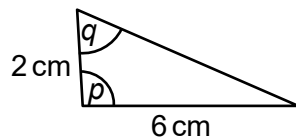


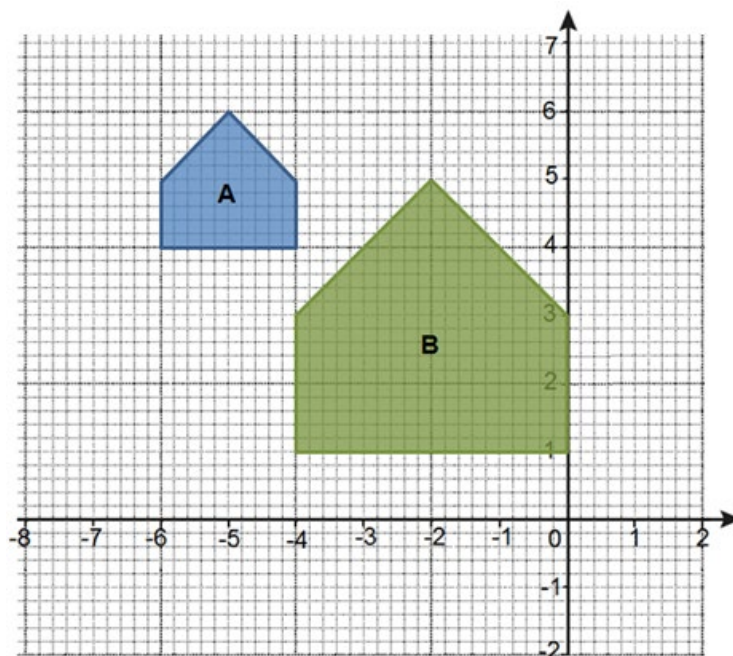
Foundation Check In - 9.04 Similarity

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

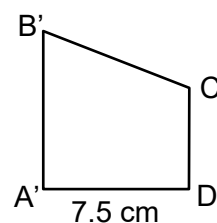
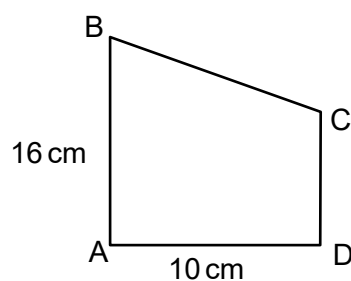


Not to scale

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



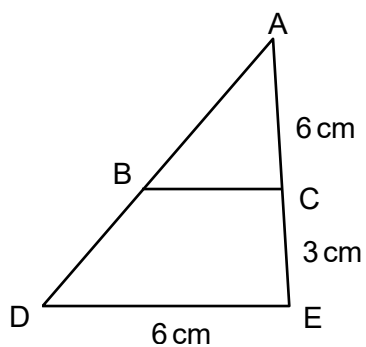
3. Shapes $ABCD$ and $A'B'C'D'$ are similar. Find length $A'B'$.



Not to scale

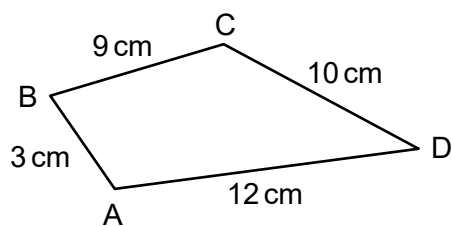
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4. Triangle ABC is similar to triangle ADE. Work out length BC.

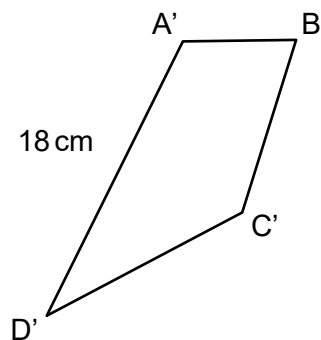


Not to scale

5. Calculate the missing lengths in these similar shapes.



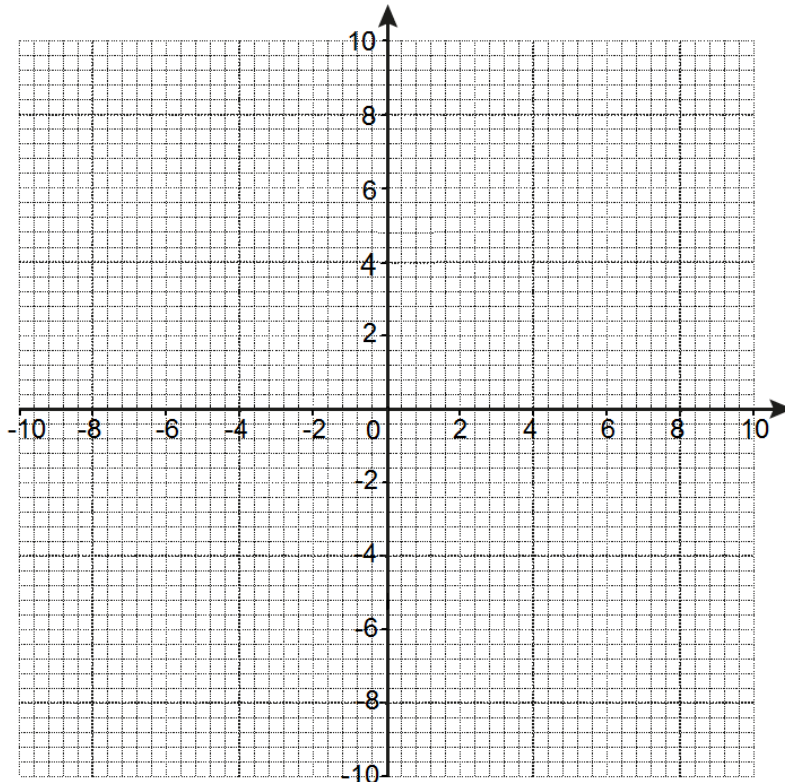
Not to scale



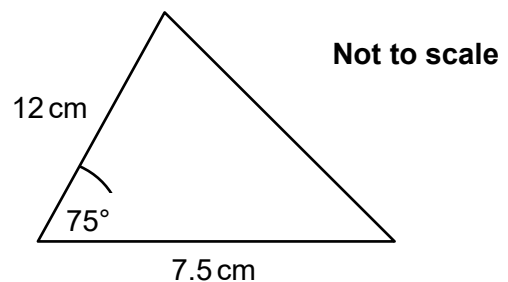
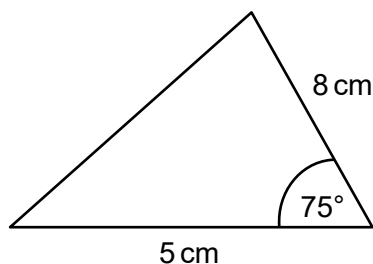
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6. Plot the following points on the coordinate grid to create triangle ABC.
- A (4, 2)
 - B (8, 2)
 - C (6, 8)

Enlarge the triangle using a scale factor of $\frac{1}{2}$ about the point (-2, 0).



7. 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.
8. Prove that these two triangles are similar.

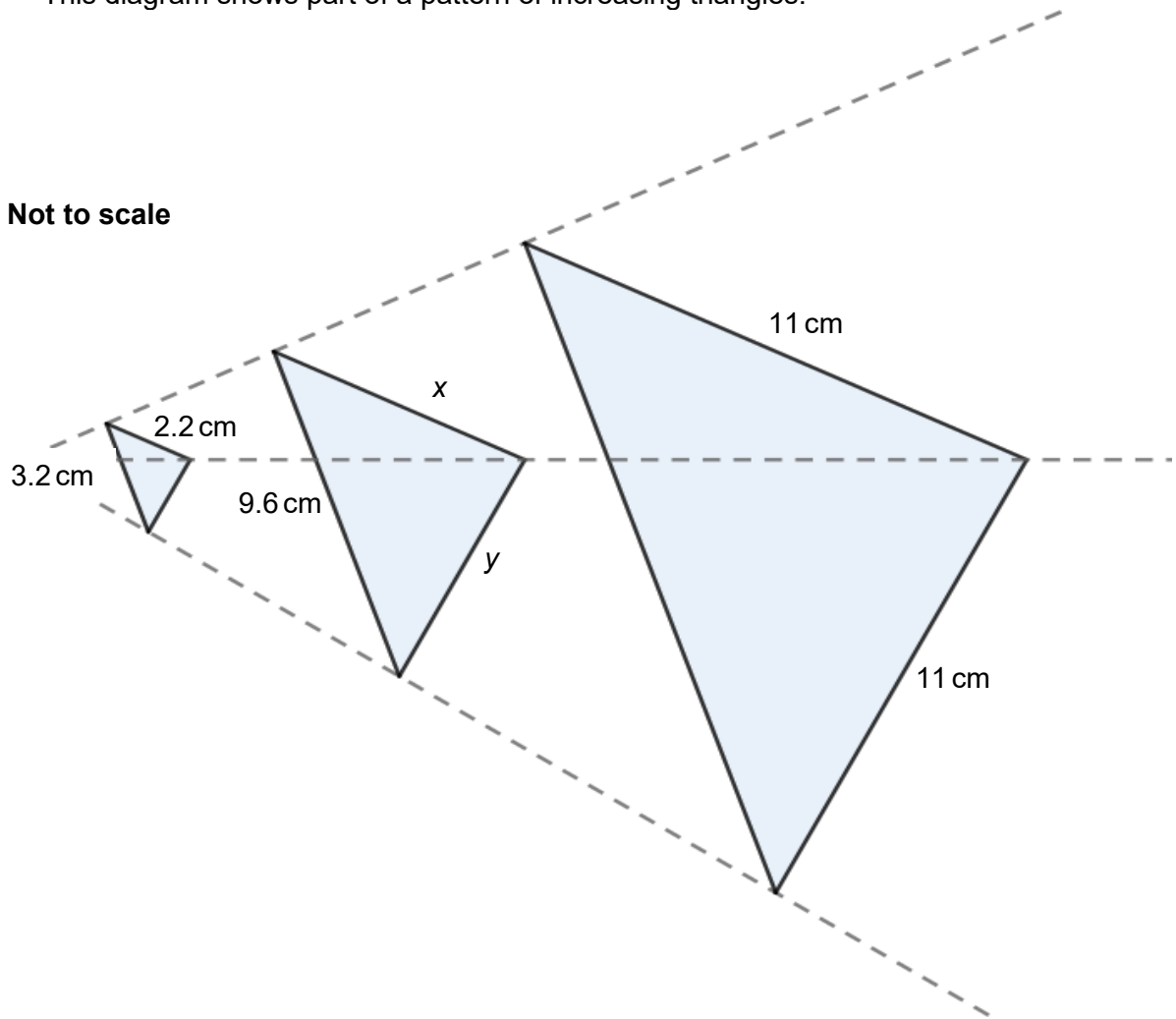


9. The sides of a triangle are 5 cm, 6 cm and 10 cm. Find the length of the shortest side of a similar triangle whose longest side is 35 cm.

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10. This diagram shows part of a pattern of increasing triangles.

Not to scale



What are the values of x and y ?

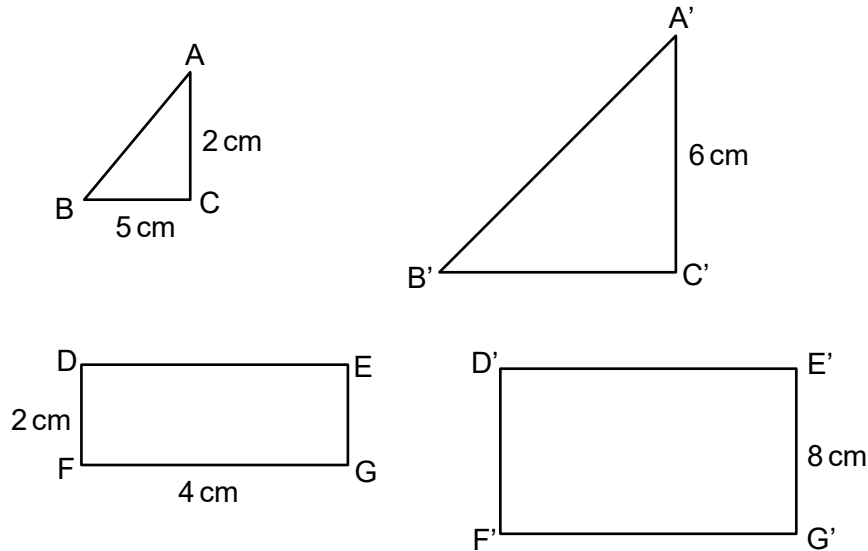
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Extension

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.



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Answers

- Scale factor is $\frac{5}{2} = 2.5$ so $x = 6 \times 2.5 = 15$ cm.
- Centre of enlargement $(-8, 7)$, scale factor 2.
- Scale factor is $\frac{7.5}{10} = \frac{3}{4}$ so $A'B' = 16 \times \frac{3}{4} = 12$ cm.
- Scale factor is $\frac{AC}{AE} = \frac{6}{9} = \frac{2}{3}$ so $BC = 6 \times \frac{2}{3} = 4$ cm.
- Scale factor is $\frac{18}{12} = 1.5$ so $A'B' = 3 \times 1.5 = 4.5$ cm, $B'C' = 9 \times 1.5 = 13.5$ cm and $C'D' = 10 \times 1.5 = 15$ cm.
- Enlarged triangle is at $A'(1, 1)$, $B'(3, 1)$, $C'(2, 4)$.
- $\frac{12}{8} = \frac{15}{10} \left(= \frac{18}{12} \right) = 1.5$ oe
- The sides in the two triangles are enlarged by the same scale factor, $\frac{12}{8} = 1.5$ and $\frac{7.5}{5} = 1.5$. The angle in between the two sides is the same, 75° . Therefore the two triangles are similar.
- Scale factor is $\frac{35}{10} = 3.5$ so shortest side is $5 \times 3.5 = 17.5$ cm.
- Scale factor is $\frac{9.6}{3.2} = 3$ therefore $x = 2.2 \times 3 = 6.6$ cm
It can be seen from the third triangle that these are isosceles triangles, so $y = x = 6.6$ cm.

Extension

Length $B'C'$ is 15 cm (scale factor 3).
Length $F'G'$ is 16 cm (scale factor 4).
Areas of triangles: 5 cm^2 and 45 cm^2 .
Areas of rectangles: 8 cm^2 and 128 cm^2 .

There is a scale factor for the triangle areas of 9 (from 5 cm^2 to 45 cm^2) and for the rectangle areas of 16 (from 8 cm^2 to 128 cm^2). 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
AO1	1	Apply similarity to calculate an unknown length in similar triangles			
AO1	2	Identify scale factor and centre of enlargement			
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	5	Apply similarity to calculate an unknown length in similar shapes			
AO2	6	Carry out enlargement with a fractional scale factor			
AO2	7	Apply similarity to calculate an unknown length in similar triangles			
AO2	8	Prove that two triangles are similar			
AO3	9	Apply similarity to calculate an unknown length in similar triangles			
AO3	10	Identify lengths in an enlargement problem			

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