

GCSE Maths: Similar shapes and scale factors (Higher): answers

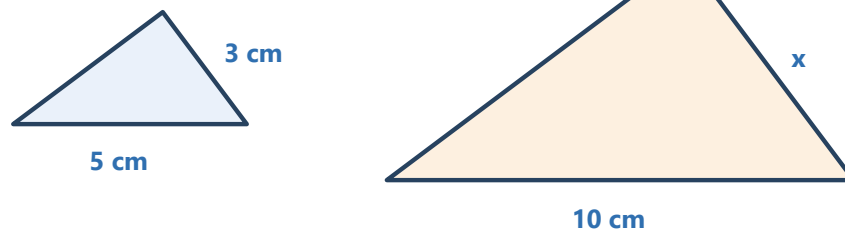
GCSE Maths - Transformations and Similarity - Higher - Lesson 21.8

Answers. Final answers to the worksheet questions. Full step-by-step solutions for every question are free at websink.site/gcse/maths/ch21-transformations-congruence-similarity/higher/similar-shapes-and-scale-factors/

Exercise 21I Similar shapes and missing lengths Non-calculator

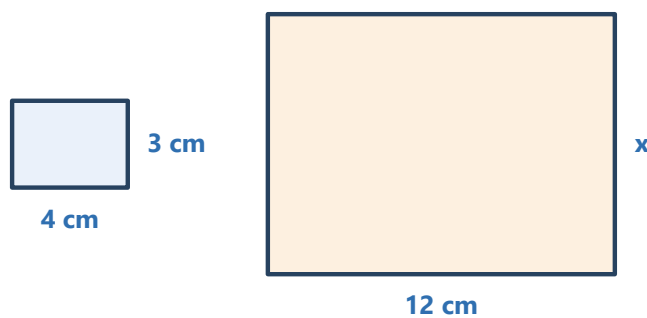
- 1 Each pair of shapes is similar and drawn to scale. Work out the value of x in each pair.

(a)



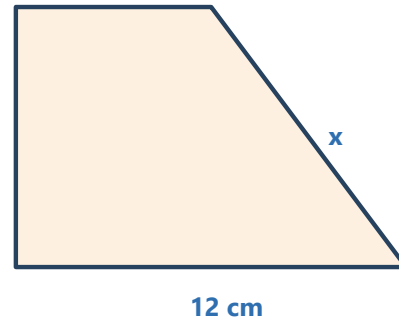
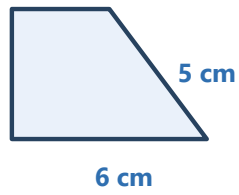
Answer: $x = 6$ cm

(b)



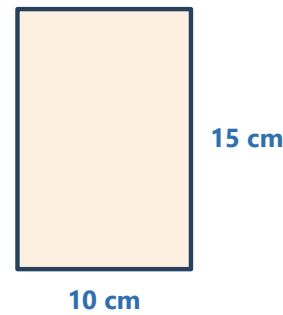
Answer: $x = 9$ cm

(c)



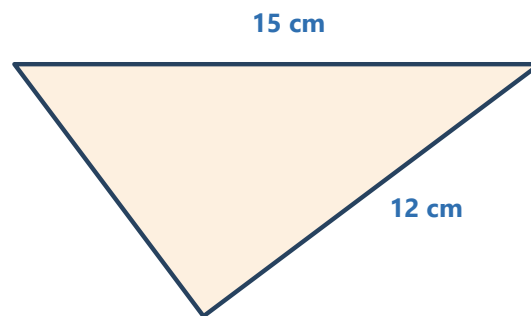
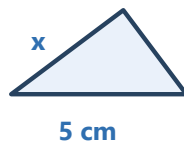
Answer: $x = 10$ cm

- 2 The two shapes are mathematically similar. The diagrams are drawn to scale. Work out the value of x .



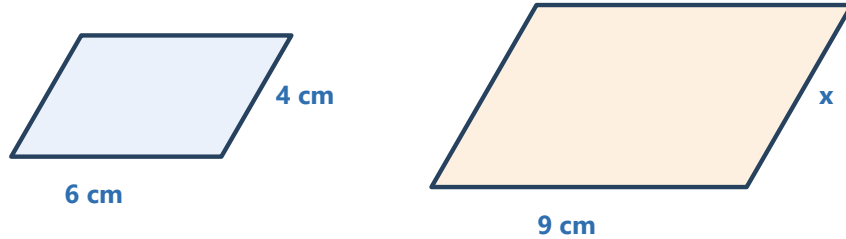
Answer: $x = 6$ cm

- 3 The two shapes are mathematically similar. The diagrams are drawn to scale. Work out the value of x .



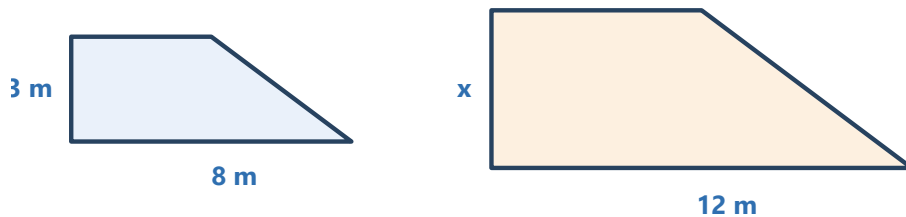
Answer: $x = 4$ cm

- 4 The two shapes are mathematically similar. The diagrams are drawn to scale. Work out the value of x .



Answer: $x = 6$ cm

- 5 The two shapes are mathematically similar. The diagrams are drawn to scale. Work out the value of x .



Answer: $x = 4.5$ m

- 6 The ratio of the corresponding sides of two similar shapes is 2 : 5. A side of the smaller shape is 8 cm. Work out the length of the matching side of the larger shape.

Answer: 20 cm

- 7 Say whether each pair of rectangles is similar. Show your working.

- (a) 4 cm by 6 cm and 6 cm by 9 cm

Answer: Similar

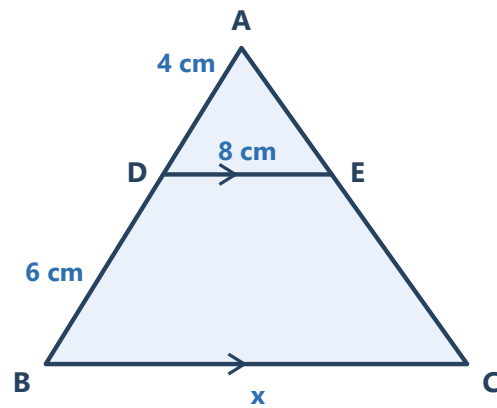
- (b) 3 cm by 5 cm and 6 cm by 9 cm

Answer: Not similar

- (c) 2 cm by 5 cm and 4 cm by 10 cm

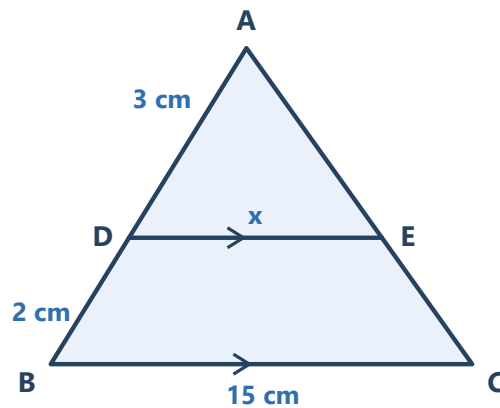
Answer: Similar

- 8 In triangle ABC, D is on AB and E is on AC. DE is parallel to BC. The diagram is drawn to scale. Work out the value of x .



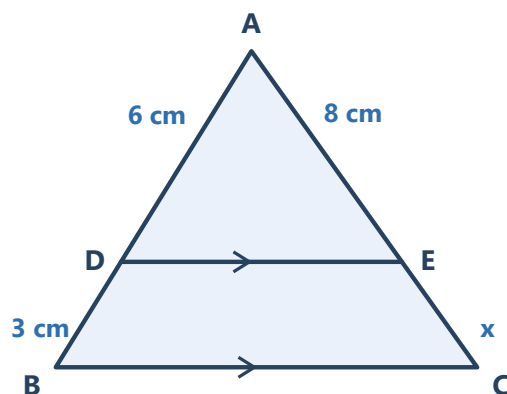
Answer: $x = 20$ cm

- 9 In triangle ABC, D is on AB and E is on AC. DE is parallel to BC. The diagram is drawn to scale. Work out the value of x .



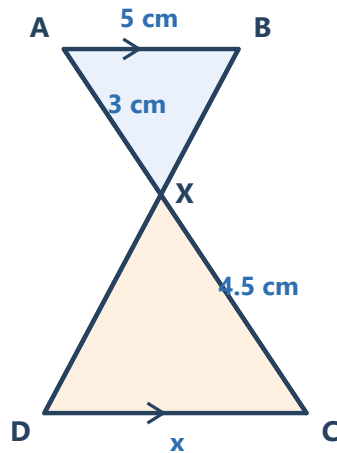
Answer: $x = 9$ cm

- 10 In triangle ABC, D is on AB and E is on AC. DE is parallel to BC. The diagram is drawn to scale. Work out the value of x .



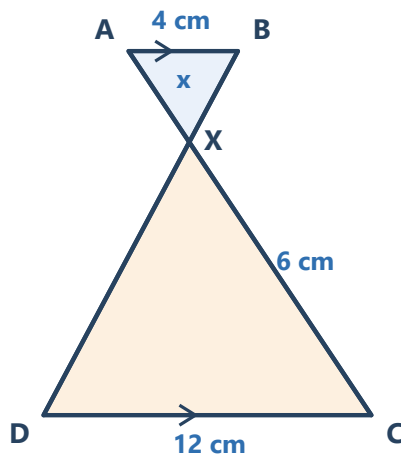
Answer: $x = 4$ cm

- 11 AC and BD cross at X. AB is parallel to CD. The diagram is drawn to scale. Work out the value of x .



Answer: $x = 7.5$ cm

- 12 AC and BD cross at X. AB is parallel to CD. The diagram is drawn to scale. Work out the value of x .



Answer: $x = 2$ cm

- 13 A photograph measures 12 cm by 18 cm. It is enlarged so that its width becomes 20 cm. Work out the new height of the photograph.

Answer: 30 cm

- 14 A model car is made with a scale of 1 : 24. The real car is 4.8 m long. Work out the length of the model, in centimetres.

Answer: 20 cm

- 15 A pole 2 m tall casts a shadow 1.5 m long. At the same time a building casts a shadow 18 m long. Work out the height of the building.

Answer: 24 m

- 16 Explain why any two squares are similar, but two rectangles are not always similar.

Answer: Squares: all angles 90° and sides in one ratio; rectangles can have different length : width ratios

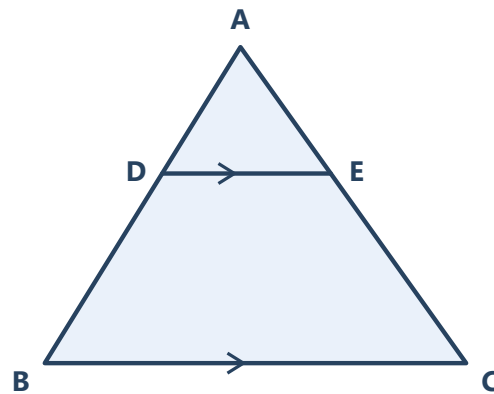
- 17** Triangle ABC has angles of 40° and 60° . Triangle PQR has angles of 60° and 80° . Show that the triangles are similar.

Answer: Angles 40° , 60° , 80° in both

- 18** The two triangles are similar. The sides of the smaller triangle are 6 cm and 8 cm. The matching sides of the larger triangle are x cm and $(x + 6)$ cm. Work out the value of x .

Answer: $x = 18$

- 19** In triangle ABC, D is a point on AB and E is a point on AC. DE is parallel to BC. Prove that triangles ADE and ABC are similar.

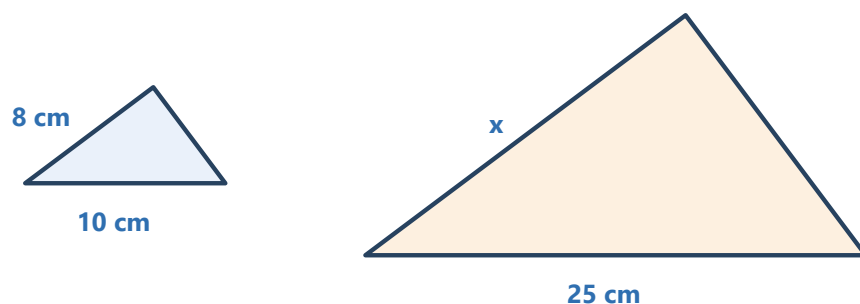


Answer: Angle A common, angle ADE = angle ABC (corresponding), angle AED = angle ACB (corresponding): similar

- 20 Challenge.** A4 paper measures 297 mm by 210 mm and A5 paper measures 210 mm by 148.5 mm. Show that A4 and A5 paper are similar rectangles (correct to 3 significant figures).

Answer: $297 \div 210 = 1.41$ and $210 \div 148.5 = 1.41$

- 21** The two shapes are mathematically similar. The diagrams are drawn to scale. Work out the value of x .



Answer: $x = 20$ cm