

Fractional enlargement

Year 7 About 75 minutes No calculator 45 marks



Hints online, answers free with an account:
mathswariz.uk/worksheets/ks3-year-7-fractional-enlargement/

Date _____

A Do Now

Quick questions to start.

- A1** Needed today [1 mark] **A2** Needed today [1 mark]
 Work out $\frac{1}{3}$ of 18. Work out $\frac{2}{3}$ of 15.

Answer

Answer

- A3** Last lesson [1 mark] **A4** From chapter 2 [1 mark]
 Two squares have sides of 2 cm and 6 cm. Write the ratio of their areas in its simplest form. A side of a shape is 3 cm long. The shape is enlarged by a scale factor of 4. How long is this side on the image?

Answer

Answer

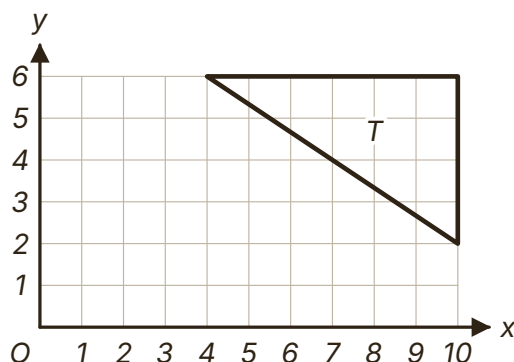
B Example, then your turn

Year 7

Your teacher works through each example with you. Then try the one beside it.

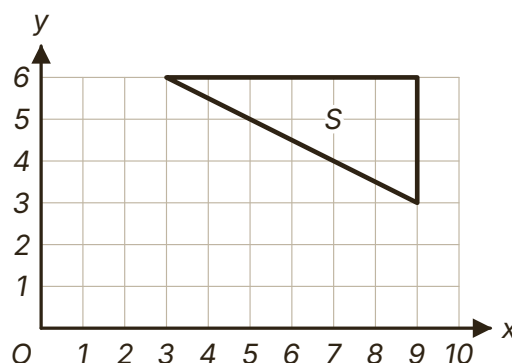
EXAMPLE 1

Triangle T is enlarged by a scale factor of $\frac{1}{2}$ about the origin. Write down the coordinates of the vertices of the image.



Hint About the origin, multiply each coordinate by the scale factor.

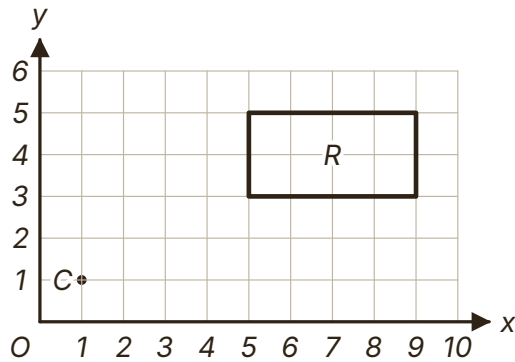
- B1** Triangle S is enlarged by a scale factor of $\frac{1}{3}$ about the origin. Write down the coordinates of the vertices of the image. [3 marks]



Answer

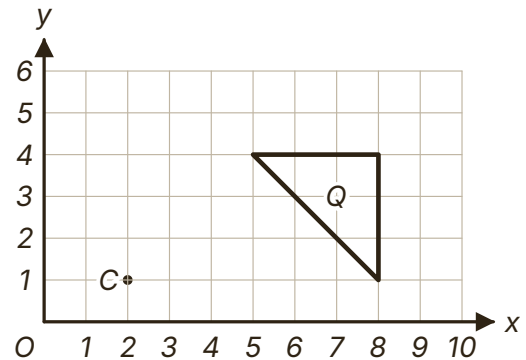
EXAMPLE 2

Rectangle R is enlarged by a scale factor of $\frac{1}{2}$ about the centre $C(1, 1)$. Write down the coordinates of the vertices of the image.



Hint Count across and up from C to each vertex, halve both, and count that far from C .

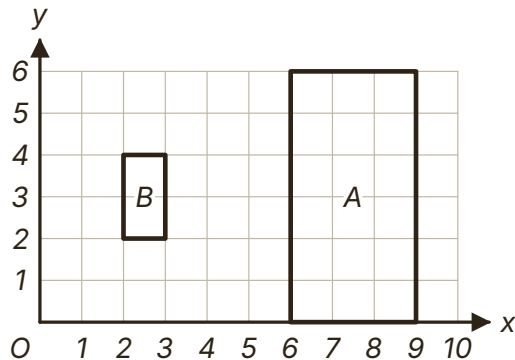
- B2** Triangle Q is enlarged by a scale factor of $\frac{1}{3}$ about the centre $C(2, 1)$. Write down the coordinates of the vertices of the image. [3 marks]



Answer

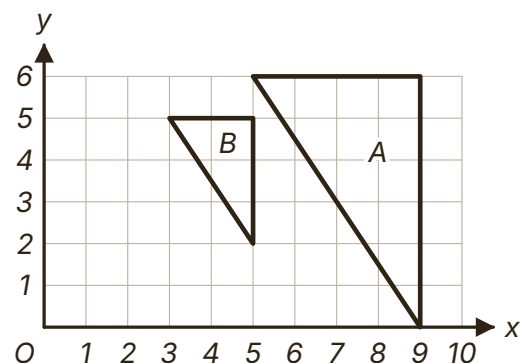
EXAMPLE 3

Rectangle B is an enlargement of rectangle A . Work out the scale factor and the coordinates of the centre of enlargement.



Hint Scale factor = a length on the image $\div$ the same length on the object. Join each vertex to its image and extend the lines until they meet.

- B3** Triangle B is an enlargement of triangle A . Work out the scale factor and the coordinates of the centre of enlargement. [3 marks]



Answer

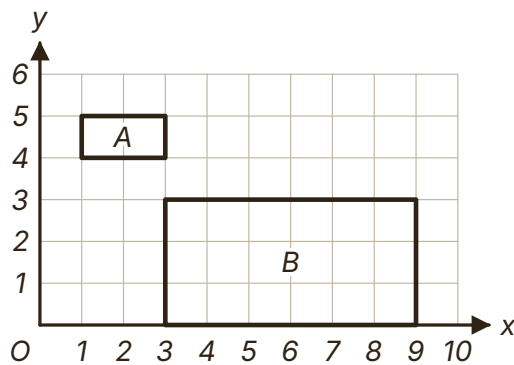
- C1** The points $A(12, 6)$, $B(8, 10)$ and $C(4, 2)$ are enlarged by a scale factor of $\frac{1}{2}$ about the origin. Write down the coordinates of the images A' , B' and C' . [2 marks]

Answer

- C2** A triangle has vertices $(9, 6)$, $(12, 0)$ and $(3, 3)$. It is enlarged by a scale factor of $\frac{2}{3}$ about the origin. Write down the coordinates of the vertices of the image. [2 marks]

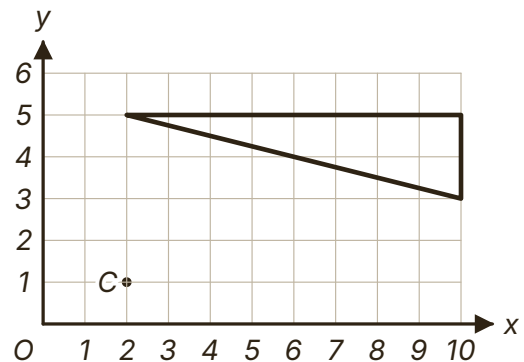
Answer

- C3** Rectangle B is an enlargement of rectangle A . (a) Write down the scale factor of the enlargement from A to B . (b) Write down the scale factor of the enlargement from B to A . [2 marks]



Answer

- C4** Enlarge the triangle by a scale factor of $\frac{1}{2}$ about the centre C . Draw the image on the grid. [2 marks]



- C5** Rectangle A is 18 cm long and 12 cm wide. Rectangle B is an enlargement of A . The length of B is 6 cm. Work out the scale factor of the enlargement from A to B , and the width of B . [3 marks]

Answer

D1

Aisha says, "Triangle T has angles of 36° , 64° and 80° . When it is enlarged by a scale factor of $\frac{1}{2}$, its angles become 18° , 32° and 40° ."

[3 marks]

Explain why Aisha is wrong, and write down the angles of the image.

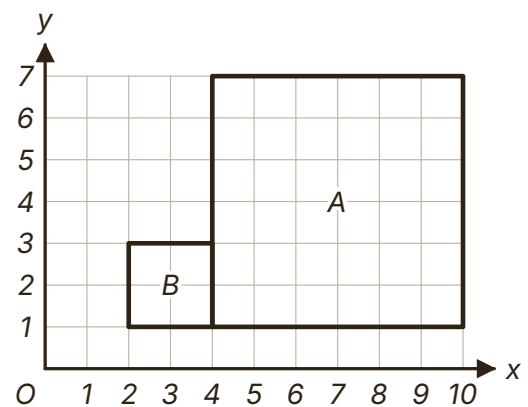
Answer

D2 Square B is an enlargement of square A .

- (a) Write down the scale factor of the enlargement from A to B . [1 mark]

Answer

- (b) Find the coordinates of the centre of enlargement. [2 marks]



Answer

- (c) Square B is enlarged by a scale factor of 2 about the same centre to give square D . Write down the coordinates of the vertex of D that is furthest from the centre. [2 marks]

Answer

Total for D2: 5 marks

- D3** The point $P(24, 12)$ is enlarged by a scale factor of $\frac{1}{2}$ about the origin to give P' . Then P' is enlarged by a scale factor of $\frac{1}{3}$ about the origin to give P'' . Work out the coordinates of P'' , and the scale factor of the single enlargement about the origin that takes P straight to P'' . [4 marks]

Answer

D4 Triangle ABC is enlarged by a scale factor of $\frac{3}{4}$ to give triangle $A'B'C'$. $A'B' = 9$ cm, $BC = 20$ cm and angle $ABC = 50^\circ$.

- (a) Work out the length of AB . [2 marks]

Answer

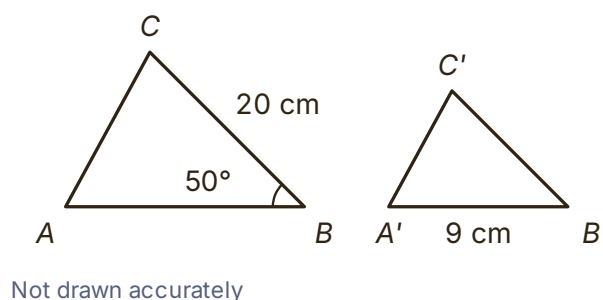
- (b) Work out the length of $B'C'$. [1 mark]

Answer

- (c) Write down the size of angle $A'B'C'$. [1 mark]

Answer

Total for D4: 4 marks



E Extension

Stretch

No route is given. The hints are at the end of the sheet. Use one at a time.

- E1** Rectangle R has vertices $(0,0)$, $(12,0)$, $(12,8)$ and $(0,8)$. It is enlarged about the origin by a fractional scale factor. The image has an area of 6 square units. Work out the coordinates of the vertex of the image that is not on an axis. [5 marks]

Answer

Extension hints

Cover these with paper. Uncover one at a time.

- E1** **Hint 1** Work out the area of R . How many times smaller is the image?
- Hint 2** The area of R is 96, so the image is $\frac{1}{16}$ of it. Which scale factor multiplied by itself gives $\frac{1}{16}$?
- Hint 3** The scale factor is $\frac{1}{4}$. Multiply $(12, 8)$ by it.

How did it go?

Colour one circle on each line: not yet, nearly, yes.

- I can enlarge a shape by a fractional scale factor about the origin or another centre. ☐ ☐ ☐
- I can find the scale factor and the centre of an enlargement. ☐ ☐ ☐
- I can work out lengths and areas of the image, and I know the angles do not change. ☐ ☐ ☐
- I can combine two enlargements into one. ☐ ☐ ☐