

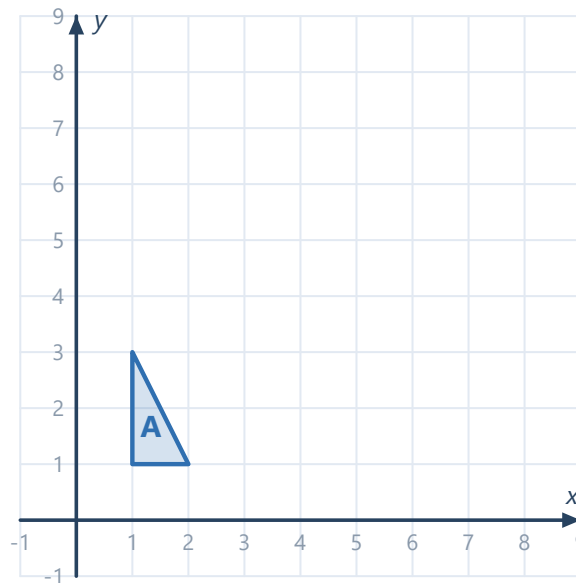
GCSE Maths: Enlargement (Higher): answers

GCSE Maths - Transformations and Similarity - Higher - Lesson 21.4

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/enlargement/

Exercise 21D Enlargement Non-calculator

- 1 Shape A has vertices at (1, 1), (2, 1), (1, 3). Enlarge A and write down the vertices of the image.



- (a) scale factor 2, centre (0, 0)

Answer: B: (2, 2), (4, 2), (2, 6)

- (b) scale factor 3, centre (0, 0)

Answer: B: (3, 3), (6, 3), (3, 9)

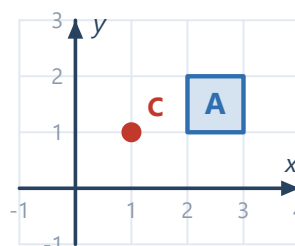
- (c) scale factor 2, centre (1, 1)

Answer: B: (1, 1), (3, 1), (1, 5)

- (d) scale factor 3, centre (0, 1)

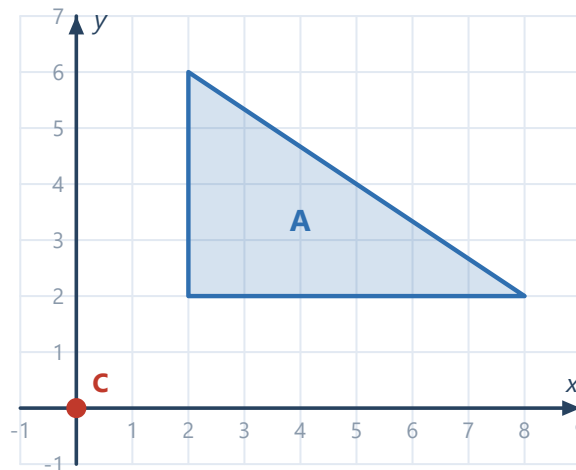
Answer: B: (3, 1), (6, 1), (3, 7)

- 2 Enlarge shape A with scale factor 3 and centre C (1, 1). Write down the coordinates of the vertices of the image B. A has vertices at (2, 1), (3, 1), (3, 2), (2, 2).



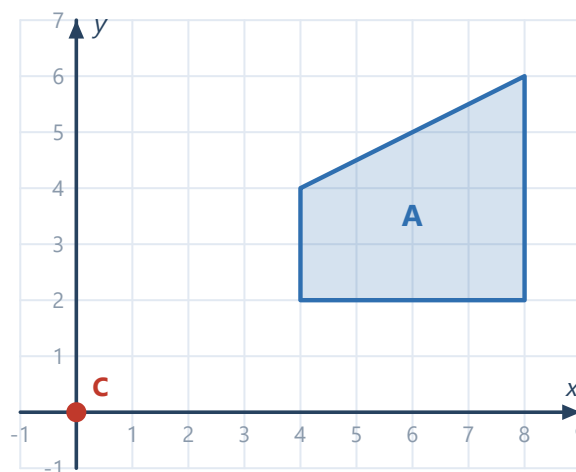
Answer: B: (4, 1), (7, 1), (7, 4), (4, 4)

- 3 Enlarge shape A with scale factor $\frac{1}{2}$ and centre C (0, 0). Write down the coordinates of the vertices of the image B. A has vertices at (2, 2), (8, 2), (2, 6).



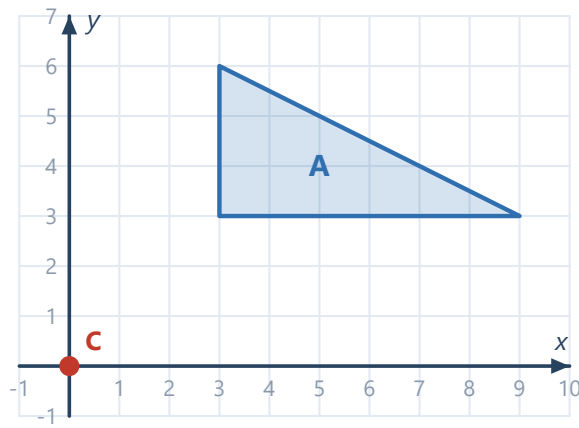
Answer: B: (1, 1), (4, 1), (1, 3)

- 4 Enlarge shape A with scale factor $\frac{1}{2}$ and centre C (0, 0). Write down the coordinates of the vertices of the image B. A has vertices at (4, 2), (8, 2), (8, 6), (4, 4).



Answer: B: (2, 1), (4, 1), (4, 3), (2, 2)

- 5 Enlarge shape A with scale factor $\frac{1}{3}$ and centre C (0, 0). Write down the coordinates of the vertices of the image B. A has vertices at (3, 3), (9, 3), (3, 6).



Answer: B: (1, 1), (3, 1), (1, 2)

6 Find the image of each point under the enlargement given.

(a) P(4, 2): scale factor 3, centre (0, 0)

Answer: (12, 6)

(b) P(4, 2): scale factor $\frac{1}{2}$, centre (0, 0)

Answer: (2, 1)

(c) P(4, 2): scale factor 2, centre (1, -1)

Answer: (7, 5)

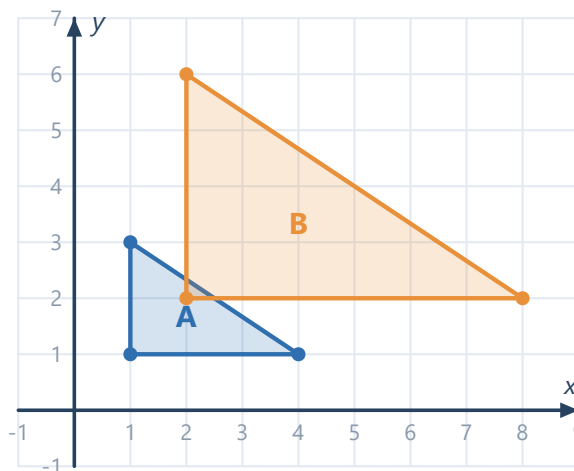
(d) P(4, 8): scale factor $\frac{1}{4}$, centre (0, 0)

Answer: (1, 2)

7 A photograph is 10 cm by 15 cm. It is enlarged with a scale factor of 2.5. Work out the length and width of the enlarged photograph.

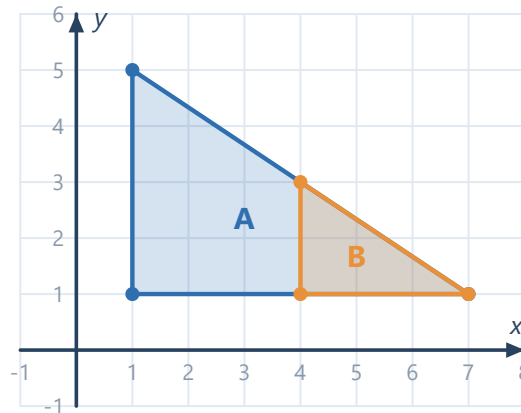
Answer: 25 cm by 37.5 cm

8 Describe fully the single transformation that maps A onto B.



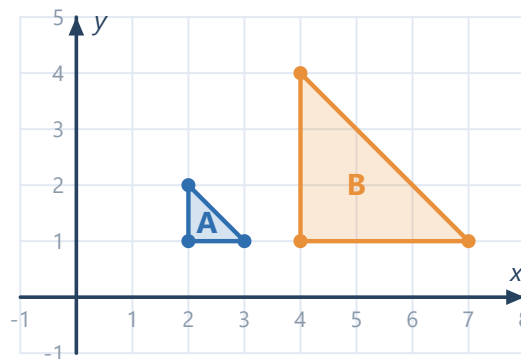
Answer: Enlargement, scale factor 2, centre (0, 0)

- 9 Describe fully the single transformation that maps shape A onto shape B.



Answer: Enlargement, scale factor $\frac{1}{2}$, centre (7, 1)

- 10 Describe fully the single transformation that maps shape A onto shape B.



Answer: Enlargement, scale factor 3, centre (1, 1)

- 11 Sam enlarges triangle A with vertices (1, 1), (2, 1), (1, 3) by scale factor 3 about the origin. He gets the image with vertices (4, 4), (5, 4), (4, 6). Explain his mistake and write down the correct image.

Answer: Sam added 3 instead of multiplying by 3. Correct image: (3, 3), (6, 3), (3, 9)

- 12 Tilly says: "A scale factor of $\frac{1}{2}$ is not an enlargement because the shape gets smaller." Is Tilly right? Explain.

Answer: No. A scale factor between 0 and 1 is still an enlargement; the image is smaller.

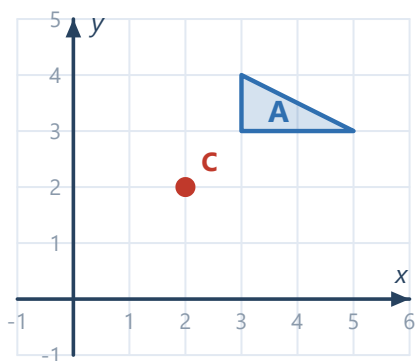
- 13 Triangle A has sides 3 cm, 4 cm and 5 cm. It is enlarged with scale factor 2 to give triangle B. Show that B is also a right-angled triangle.

Answer: B has sides 6, 8, 10 and $36 + 64 = 100$

- 14 **Challenge.** Shape A is enlarged with scale factor 2 and centre (3, 1) to give shape B. Shape B is then enlarged with scale factor $\frac{1}{2}$ and the same centre to give shape C. Where is shape C? Use the point (5, 4) on A to explain.

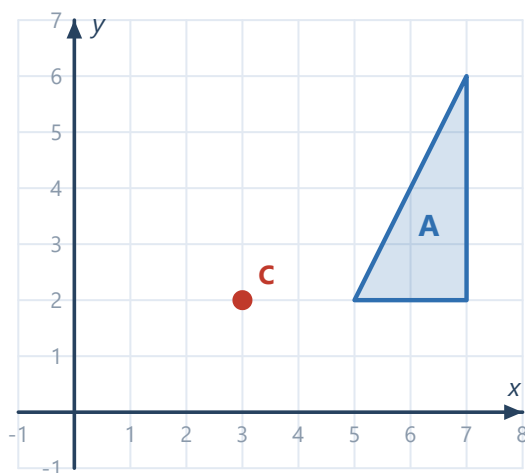
Answer: C is in the same place as A

- 15** Enlarge shape A with scale factor -2 and centre C (2, 2). Write down the coordinates of the vertices of the image B. A has vertices at (3, 3), (5, 3), (3, 4).



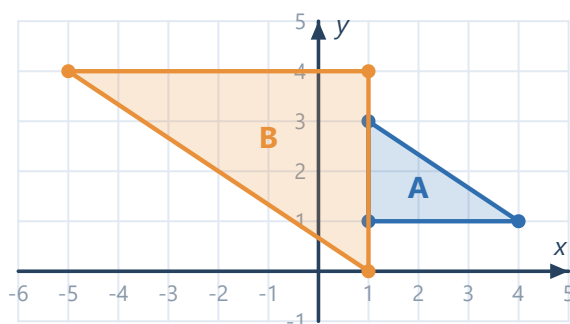
Answer: B: (0, 0), (−4, 0), (0, −2)

- 16** Enlarge shape A with scale factor $-\frac{1}{2}$ and centre C (3, 2). Write down the coordinates of the vertices of the image B. A has vertices at (5, 2), (7, 2), (7, 6).



Answer: B: (2, 2), (1, 2), (1, 0)

- 17** Describe fully the single transformation that maps shape A onto shape B.



Answer: Enlargement, scale factor -2 , centre (1, 2)

- 18** Show that an enlargement with scale factor -1 about the centre (1, 1) is the same as a rotation of 180° about (1, 1). Use the point (4, 3).

Answer: Both give $(-2, -1)$

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