

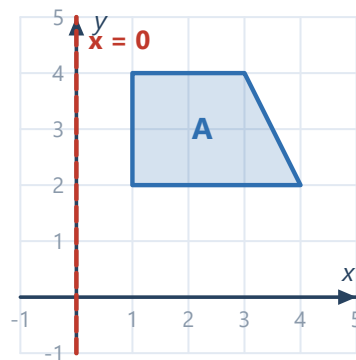
GCSE Maths Transformations and Similarity (Higher): check-up and exam-style questions: answers

GCSE Maths - Transformations and Similarity - Higher - Test yourself

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/check-up-and-exam-style-questions/

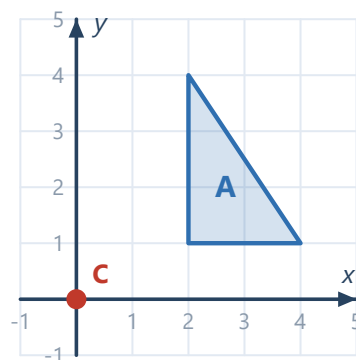
Exercise 21Z Check-up (non-calculator) Non-calculator

- 1 Reflect shape A in the y -axis. Write down the coordinates of the vertices of the image. A has vertices at (1, 2), (4, 2), (3, 4), (1, 4).



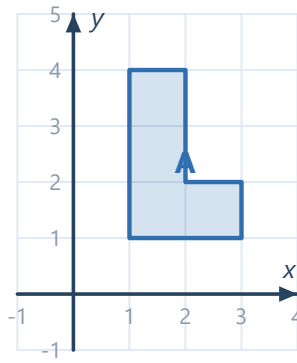
Answer: B: (-1, 2), (-4, 2), (-3, 4), (-1, 4)

- 2 Rotate shape A through 90° anticlockwise about the point C (0, 0). Write down the coordinates of the vertices of the image B. A has vertices at (2, 1), (4, 1), (2, 4).



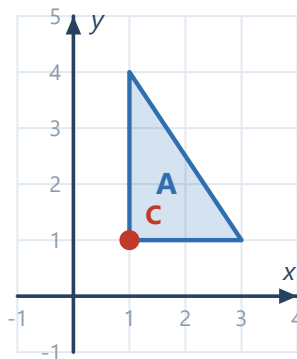
Answer: B: (-1, 2), (-1, 4), (-4, 2)

- 3 Translate shape A by the vector $\begin{pmatrix} -3 \\ 4 \end{pmatrix}$. Write down the coordinates of the vertices of the image B. A has vertices at (1, 1), (3, 1), (3, 2), (2, 2), (2, 4), (1, 4).



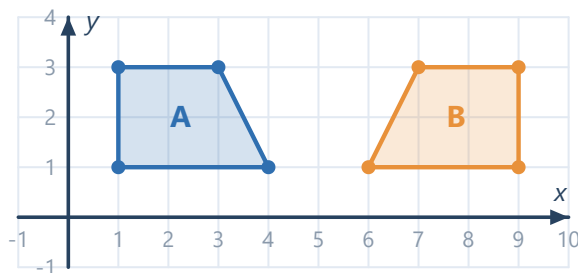
Answer: B: $(-2, 5)$, $(0, 5)$, $(0, 6)$, $(-1, 6)$, $(-1, 8)$, $(-2, 8)$

- 4 Enlarge shape A with scale factor 2 and centre C $(1, 1)$. Write down the coordinates of the vertices of the image B. A has vertices at $(1, 1)$, $(3, 1)$, $(1, 4)$.



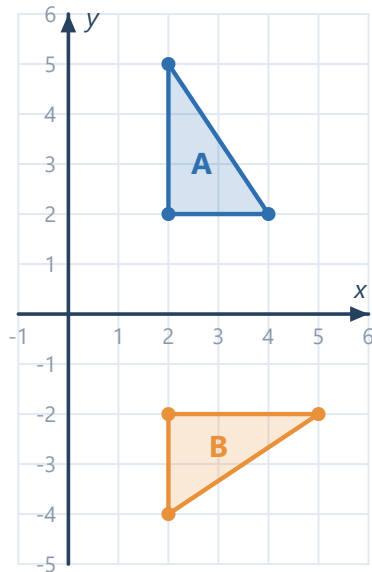
Answer: B: $(1, 1)$, $(5, 1)$, $(1, 7)$

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



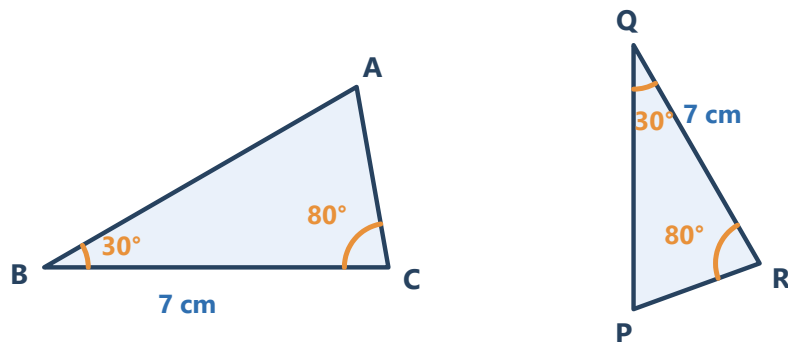
Answer: Reflection in the line $x = 5$

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



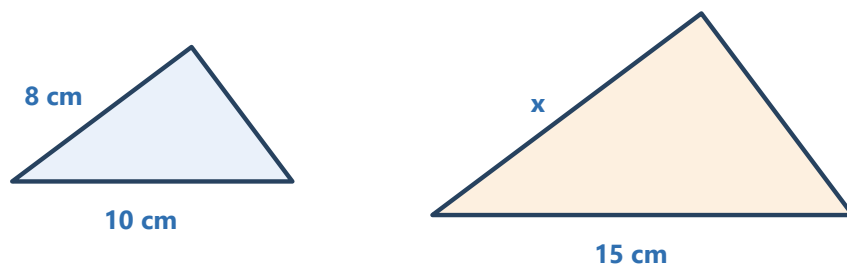
Answer: Rotation, 90° clockwise, centre $(0, 0)$

7 Are triangles ABC and PQR congruent? Give a reason.



Answer: Congruent (ASA)

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



Answer: $x = 12$ cm

9 Two similar shapes have a length scale factor of 5. The area of the smaller shape is 4 cm^2 . Work out the area of the larger shape.

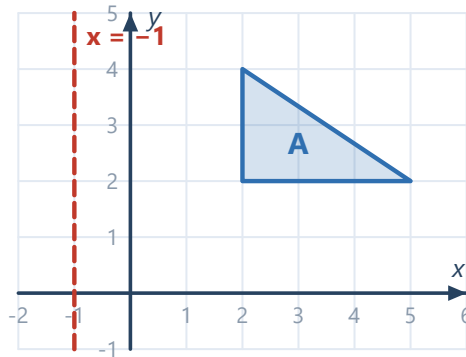
Answer: 100 cm^2

- 10 The lengths of two similar shapes are in the ratio 3 : 5. Write down the ratio of their areas and the ratio of their volumes.

Answer: Areas 9 : 25; volumes 27 : 125

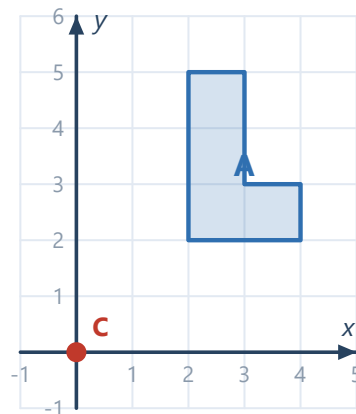
Exercise 21X Exam-style questions Non-calculator

- 1 Triangle A is drawn on the grid. Reflect triangle A in the line $x = -1$. Write down the coordinates of the vertices of the image. A has vertices at (2, 2), (5, 2), (2, 4). [2 marks]



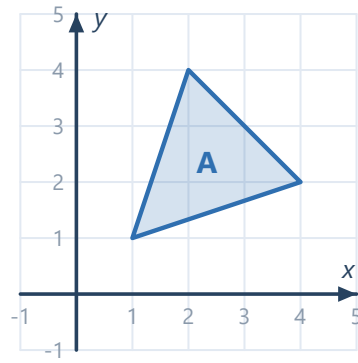
Answer: B: (-4, 2), (-7, 2), (-4, 4)

- 2 Rotate shape A through 90° anticlockwise about the origin. Write down the coordinates of the vertices of the image. A has vertices at (2, 2), (4, 2), (4, 3), (3, 3), (3, 5), (2, 5). [2 marks]



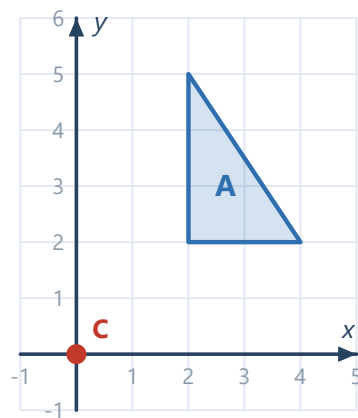
Answer: B: (-2, 2), (-2, 4), (-3, 4), (-3, 3), (-5, 3), (-5, 2)

- 3 Translate triangle A by the vector $\begin{pmatrix} -4 \\ 3 \end{pmatrix}$. Write down the coordinates of the vertices of the image. A has vertices at (1, 1), (4, 2), (2, 4). [2 marks]



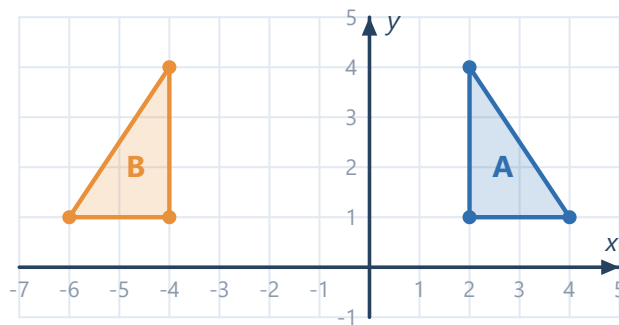
Answer: B: $(-3, 4)$, $(0, 5)$, $(-2, 7)$

- 4 Enlarge triangle A with scale factor 2 and centre $(0, 0)$. Write down the coordinates of the vertices of the image. A has vertices at $(2, 2)$, $(4, 2)$, $(2, 5)$. [2 marks]



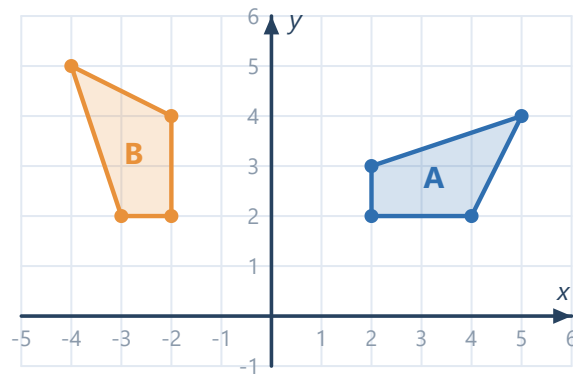
Answer: B: $(4, 4)$, $(8, 4)$, $(4, 10)$

- 5 Describe fully the single transformation that maps triangle A onto triangle B. [2 marks]



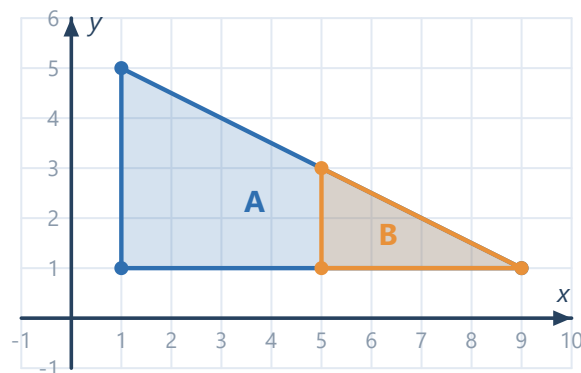
Answer: Reflection in the line $x = -1$

- 6 Describe fully the single transformation that maps shape A onto shape B. [3 marks]



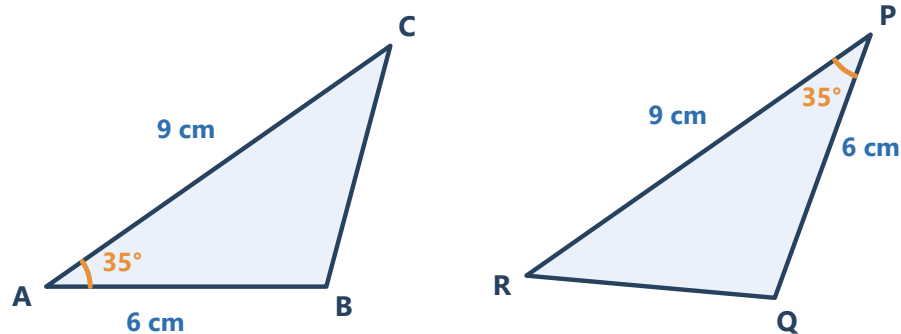
Answer: Rotation, 90° anticlockwise, centre (0, 0)

- 7 Describe fully the single transformation that maps triangle A onto triangle B. [3 marks]



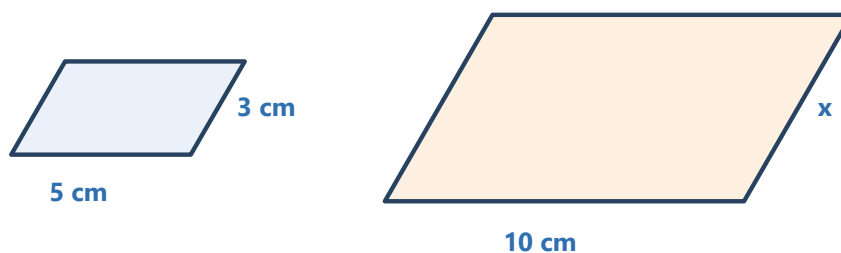
Answer: Enlargement, scale factor $\frac{1}{2}$, centre (9, 1)

- 8 Triangles ABC and PQR are shown. Are the two triangles congruent? Give a reason for your answer. [3 marks]



Answer: Congruent (SAS)

- 9 The two parallelograms are mathematically similar. Work out the value of x . [3 marks]



Answer: $x = 6$ cm

- 10** A flagpole casts a shadow 12 m long. At the same time a 1 m ruler, standing upright, casts a shadow 0.8 m long. Work out the height of the flagpole. [3 marks]

Answer: 15 m

- 11** Shape P and shape Q are similar. The length of Q is 3 times the length of P. The area of P is 8 cm^2 . Work out the area of Q. [2 marks]

Answer: 72 cm^2

- 12** Solid S and solid T are similar. Each length on T is 2 times the matching length on S. The volume of S is 12 cm^3 . (a) Work out the volume of T. The surface area of S is 20 cm^2 . (b) Work out the surface area of T.

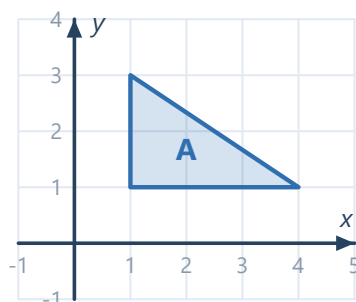
- (a) (a) Volume of T [4 marks]

Answer: 96 cm^3

- (b) (b) Surface area of T

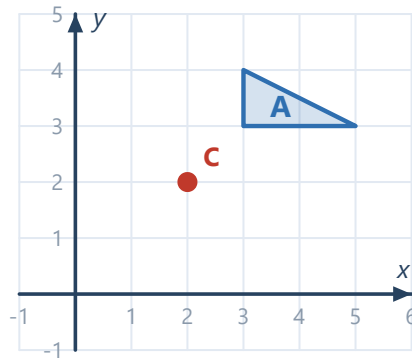
Answer: 80 cm^2

- 13** Triangle A has vertices at (1, 1), (4, 1) and (1, 3). A is rotated 90° clockwise about the origin to give B. B is then reflected in the y-axis to give C. Describe fully the single transformation that maps A onto C. [4 marks]



Answer: Reflection in the line $y = -x$

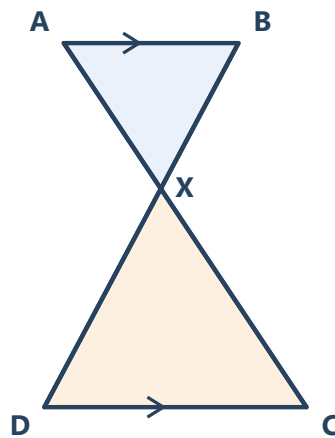
- 14** Triangle A has vertices at (3, 3), (5, 3) and (3, 4). Enlarge A with scale factor -2 and centre (2, 2). Write down the coordinates of the vertices of the image. [3 marks]



Answer: B: (0, 0), (-4, 0), (0, -2)

- 15** In the diagram, AC and BD cross at X. AB is parallel to CD. Prove that triangles XAB and XCD are similar.

[3 marks]



Answer: Angle AXB = angle CXD (vertically opposite); angle XAB = angle XCD (alternate); similar (equal angles)

- 16** Bottles A and B are similar. Bottle A is 8 cm tall and bottle B is 12 cm tall. The label on bottle A has an area of 60 cm^2 . Bottle B holds 2700 ml. (a) Work out the area of the label on bottle B. (b) Work out how much bottle A holds.

[5 marks]

- (a) (a) Area of the label on B

Answer: 135 cm^2

- (b) (b) Capacity of bottle A

Answer: 800 ml