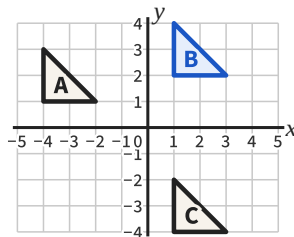


1 Translations

- a) Translate A by $\begin{pmatrix} 5 \\ 1 \end{pmatrix}$.
That is 5 right and 1 up.
Label the image B.
- b) Write the column vector that translates A onto C.

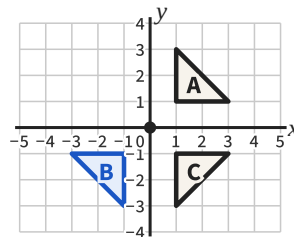


a) B at (1, 2), (3, 2), (1, 4)

b) $\begin{pmatrix} 5 \\ -5 \end{pmatrix}$

2 Rotations

- a) Rotate A 180° about (0, 0). Label the image B.
- b) A is rotated about (0, 0) to give C. Write the angle and the direction of the turn.

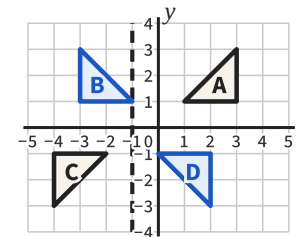


a) B at (-1, -1), (-3, -1), (-1, -3)

b) 90° clockwise

3 Reflections

- a) Reflect A in the y axis. Label the image B.
- b) Reflect C in the dashed mirror line. Label the image D.

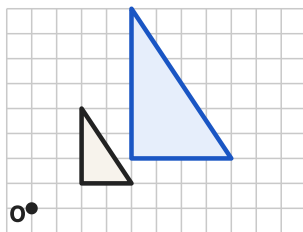


a) B at (-1, 1), (-3, 1), (-3, 3)

b) D at (2, -1), (0, -1), (2, -3)

4 Enlargement

- a) Enlarge the triangle by scale factor 2, centre O.
- b) A square has sides of 3 cm. It is enlarged by scale factor 2.
How long is each side of the image?



a) sides 2 and 3 become 4 and 6

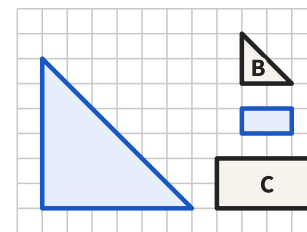
b) $3 \times 2 = 6$ cm

Transformations and vectors

Foundation B

5 Enlargement: scale factors

- a) Enlarge shape B by scale factor 3.
- b) Enlarge shape C by scale factor $\frac{1}{2}$.

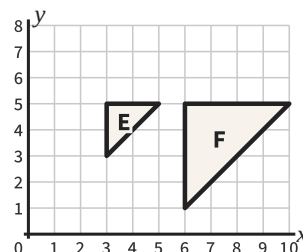


a) sides 2 and 2 become 6 and 6

b) 4 by 2 becomes 2 by 1 (anywhere)

6 Describing enlargements

- a) Shape F is an enlargement of shape E. What is the scale factor?
- b) Draw lines through matching corners of E and F.
Write the coordinates of the centre.

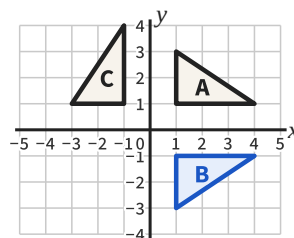


a) scale factor 2

b) centre (0, 5)

7 Mixed transformations

- a) Reflect A in the x axis. Label the image B.
- b) Which transformation maps A onto C: a translation, a reflection, a rotation or an enlargement?

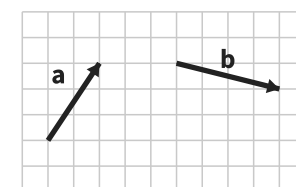


a) B at (1, -1), (4, -1), (1, -3)

b) a rotation

8 Calculating with vectors

- $\mathbf{a} = \begin{pmatrix} 2 \\ 3 \end{pmatrix}$ and $\mathbf{b} = \begin{pmatrix} 4 \\ -1 \end{pmatrix}$
- a) Work out $\mathbf{a} + \mathbf{b}$.
- b) Work out $3\mathbf{a}$.



a) $\begin{pmatrix} 2+4 \\ 3-1 \end{pmatrix} = \begin{pmatrix} 6 \\ 2 \end{pmatrix}$

b) $\begin{pmatrix} 3 \times 2 \\ 3 \times 3 \end{pmatrix} = \begin{pmatrix} 6 \\ 9 \end{pmatrix}$