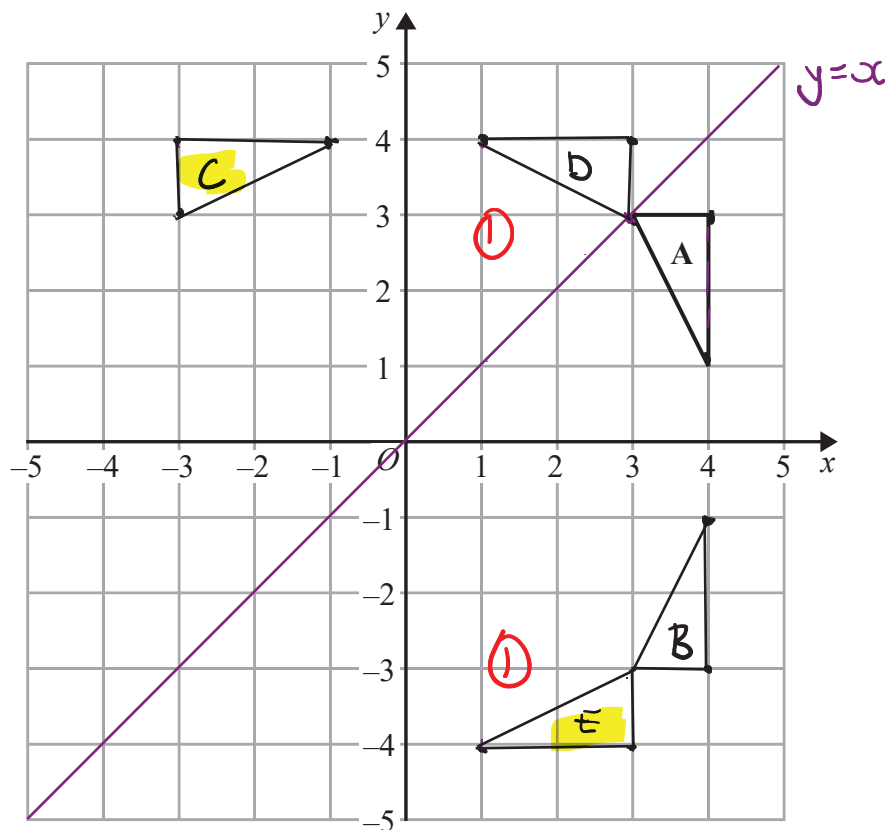


1. The diagram shows triangle A drawn on a grid.



Kyle reflects triangle A in the x -axis to get triangle B.
He then reflects triangle B in the line $y = x$ to get triangle C.

Amy reflects triangle A in the line $y = x$ to get triangle D.
She is then going to reflect triangle D in the x -axis to get triangle E.

Amy says that triangle E should be in the same position as triangle C.

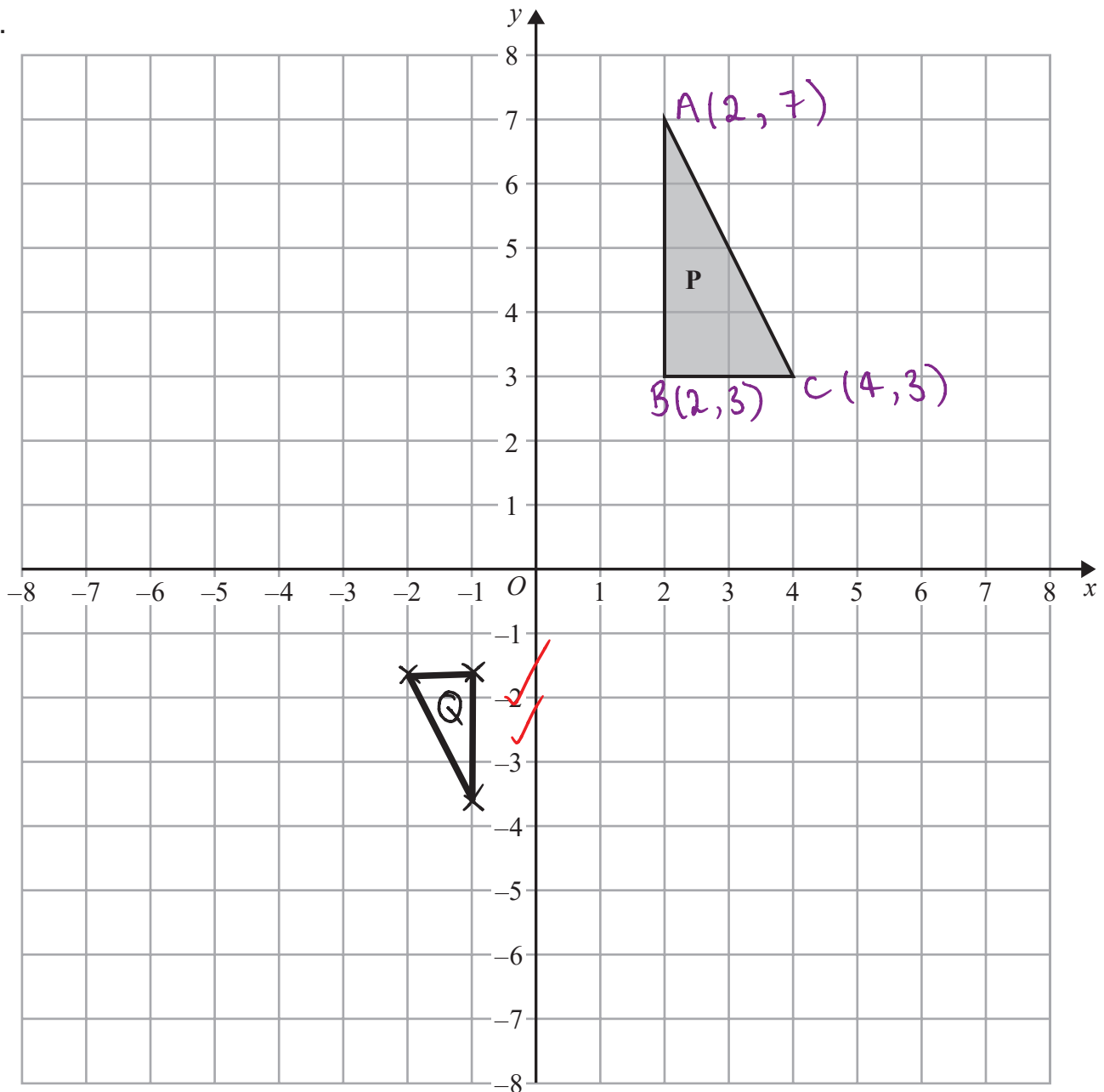
Is Amy correct?

You must show how you get your answer.

NO, Amy is NOT CORRECT because triangle E and triangle C are in different positions, as shown in the diagram. ①

(Total for Question is 3 marks)

2.



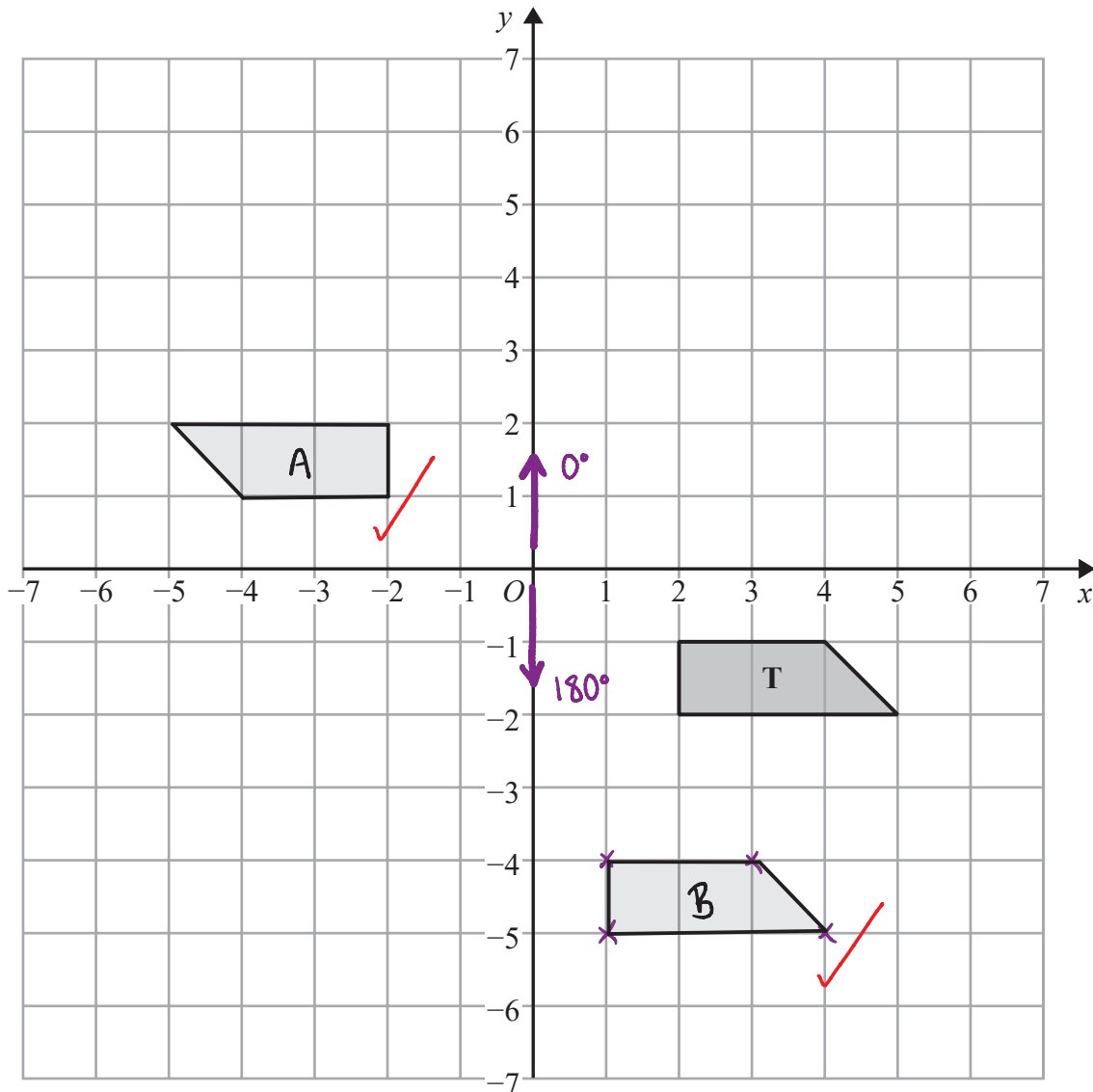
Enlarge shape **P** by scale factor $-\frac{1}{2}$ with centre of enlargement (0, 0).

Label your image **Q**.

(Total for Question is 2 marks)

A	(2, 7)	B	(2, 3)	C	(4, 3)
	$\downarrow \times -\frac{1}{2}$		$\downarrow \times -\frac{1}{2}$		$\downarrow \times -\frac{1}{2}$
	(-1, -3.5)		(-1, -1.5)		(-2, -1.5)

3.



- (a) Rotate trapezium **T** 180° about the origin.
Label the new trapezium **A**.

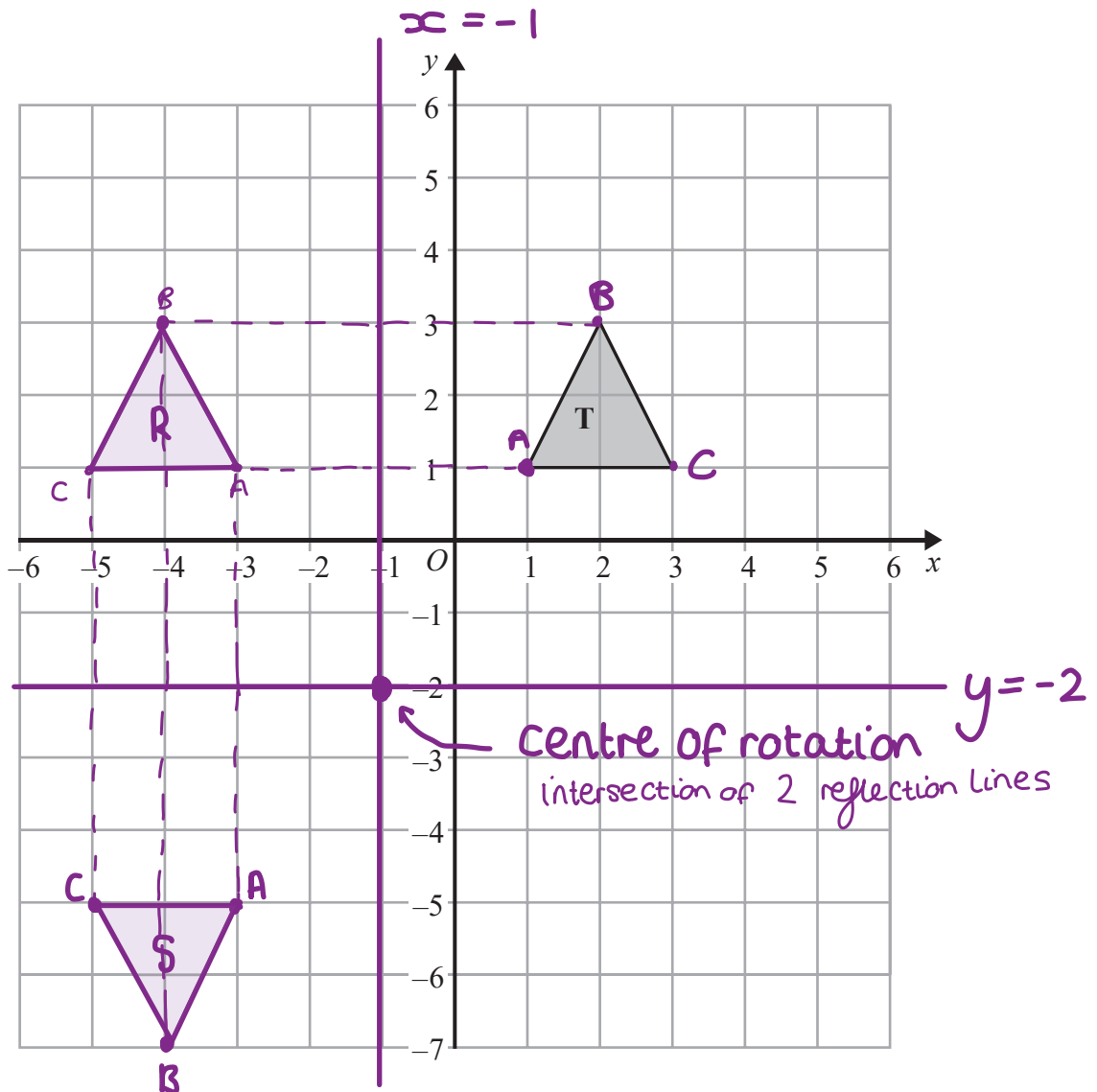
(1)

- (b) Translate trapezium **T** by the vector $\begin{pmatrix} -1 \\ -3 \end{pmatrix}$ ← x
Label the new trapezium **B**. ← y

(1)

(Total for Question is 2 marks)

4.



Shape **T** is **reflected** in the line $x = -1$ to give shape **R**.
 Shape **R** is **reflected** in the line $y = -2$ to give shape **S**.

Describe the **single transformation** that will map shape **T** to shape **S**.

Rotation 180° about $(-1, -2)$

alternatively, an enlargement of scale factor -1 with centre $(-1, -2)$

(Total for Question is 2 marks)

5.

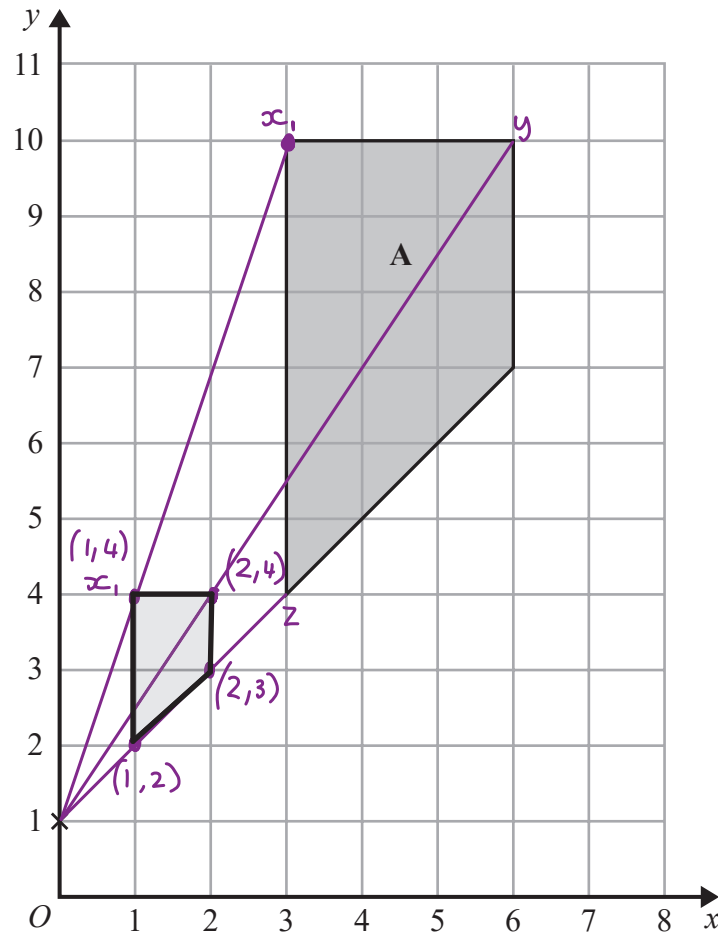
e.g. for the new point x_2 , we need to travel $\frac{1}{3}$ of the distance between the centre and x_1

So if $(0,1) \rightarrow (3,10)$ is a shift of $\begin{pmatrix} 3 \\ 9 \end{pmatrix}$

$\begin{pmatrix} 3 \\ 9 \end{pmatrix} \times \frac{1}{3} = \begin{pmatrix} 1 \\ 3 \end{pmatrix}$ from

the centre point $(0,1)$

$\therefore x_2 = (0+1, 1+3) = (1,4)$



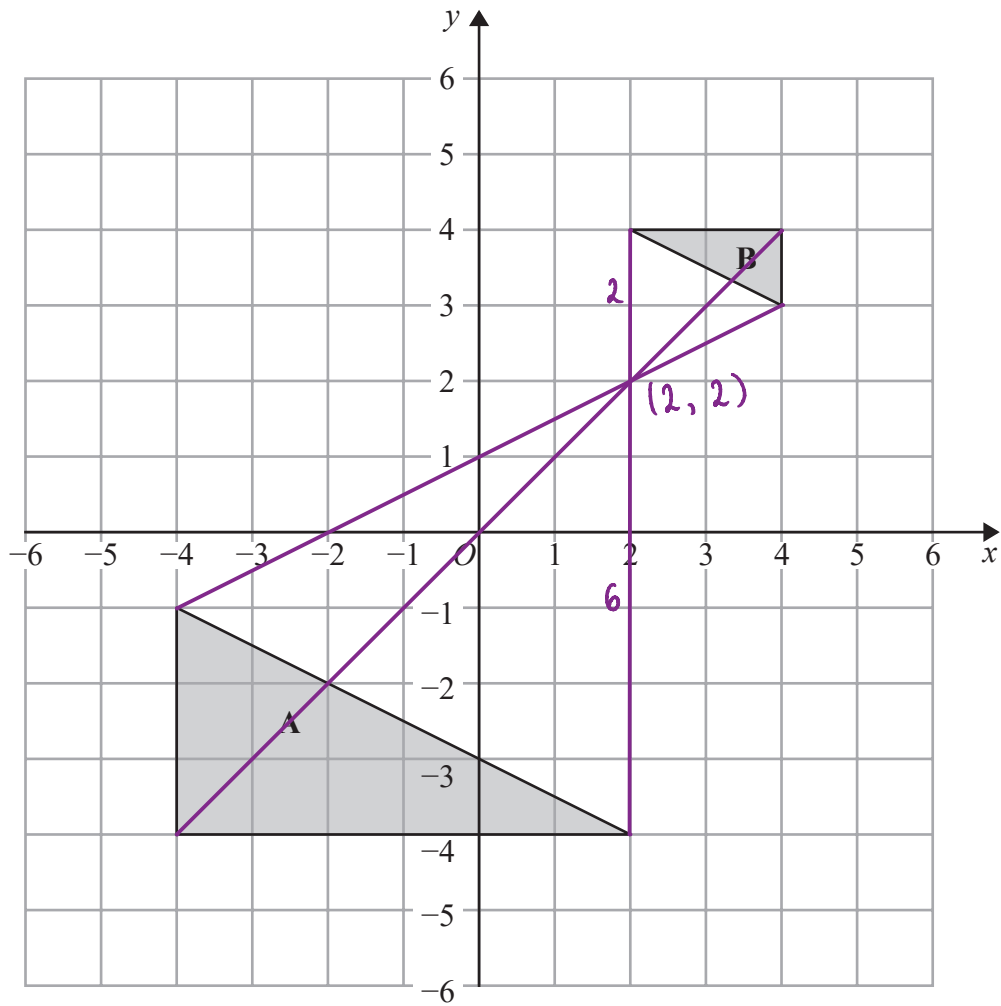
Enlarge shape A by scale factor $\frac{1}{3}$ centre $(0,1)$

↑ positive SF = expecting a shape in the same orientation

SF < 1 = smaller shape - closer to centre

(Total for Question is 2 marks)

6.



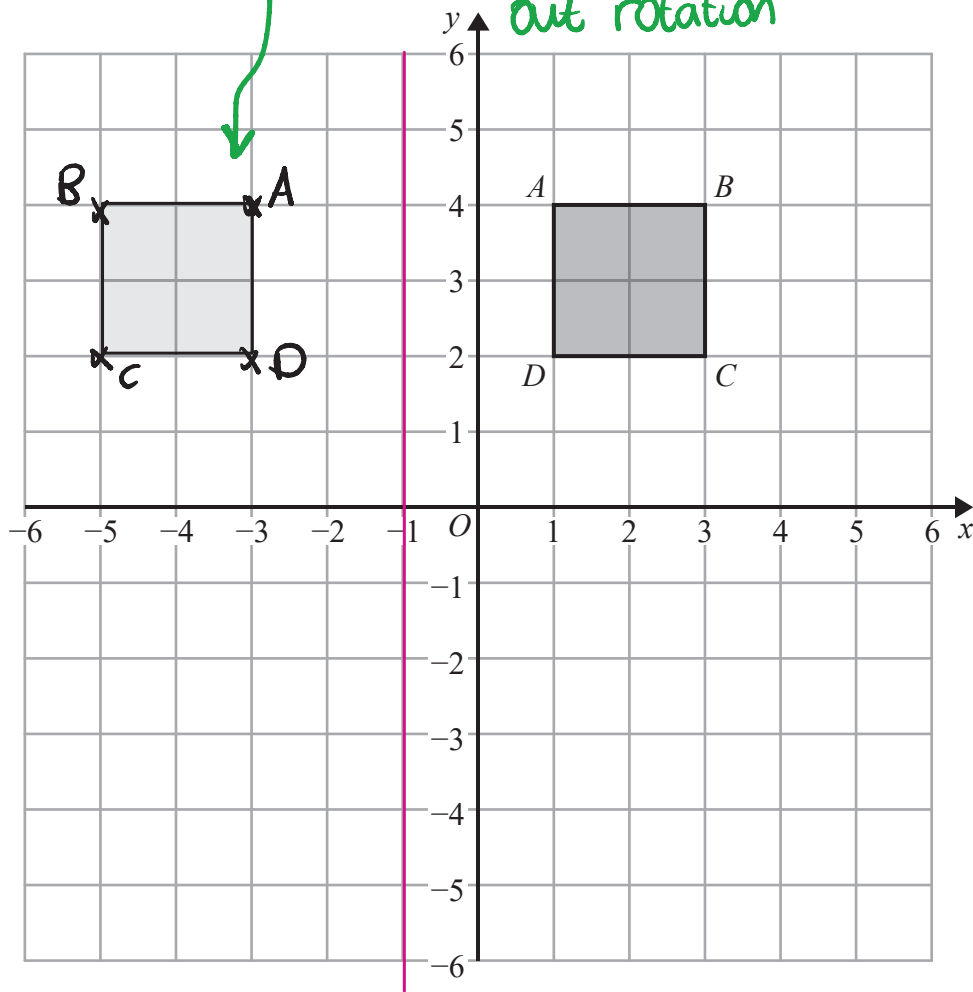
Describe fully the **single transformation** that maps triangle A onto triangle B.

Enlargement scale factor $-\frac{1}{3}$ at centre $(2, 2)$ ✓✓

(Total for Question is 2 marks)

7.

Once done reflection use tracing paper to work out rotation



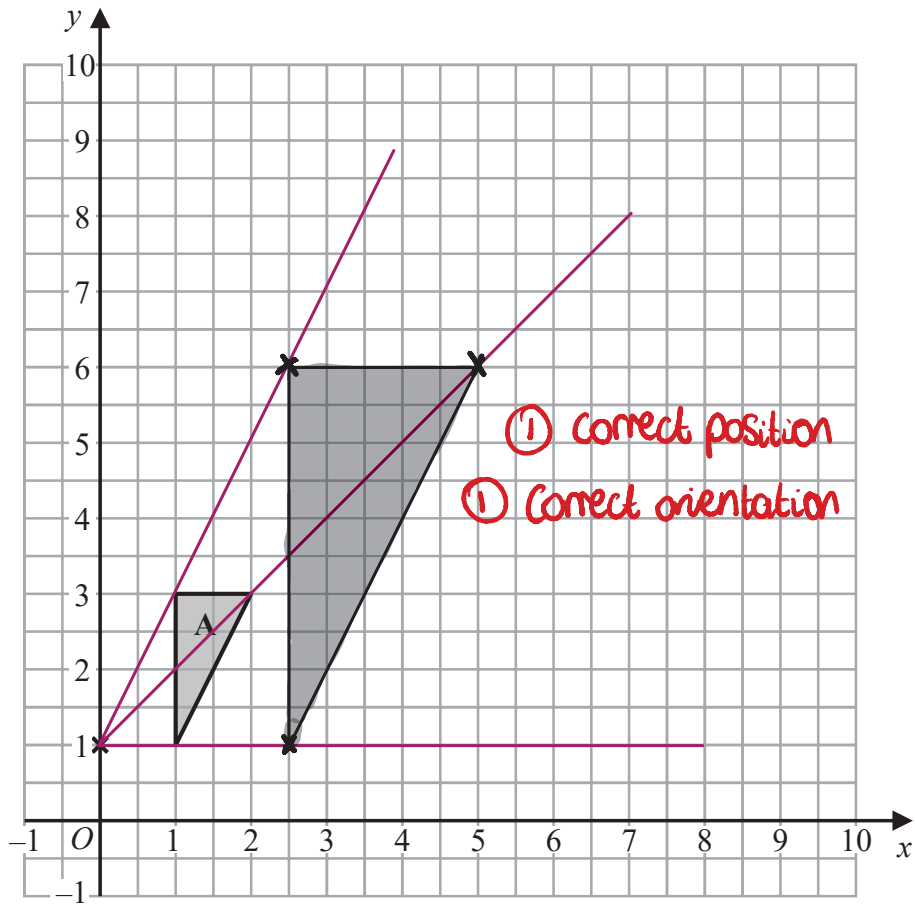
Square $ABCD$ is transformed by a combined transformation of a reflection in the line $x = -1$ followed by a rotation.

Under the combined transformation, two vertices of the square $ABCD$ are invariant.

Describe fully one possible rotation.

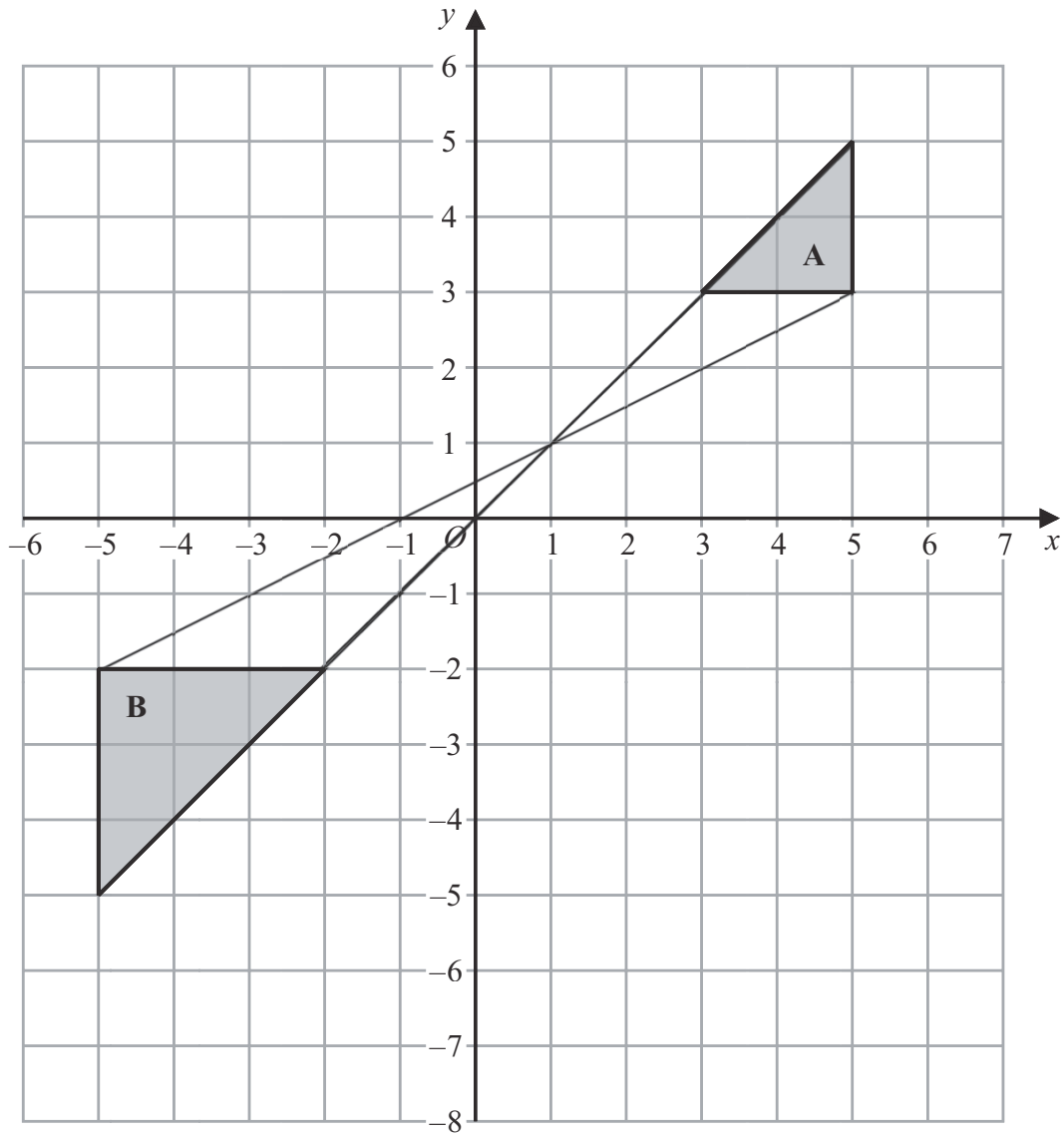
Rotation about $(-1, 0)$ 90° clockwise (2)

8.



Enlarge triangle A by **scale factor 2.5** with centre (0, 1)

9.

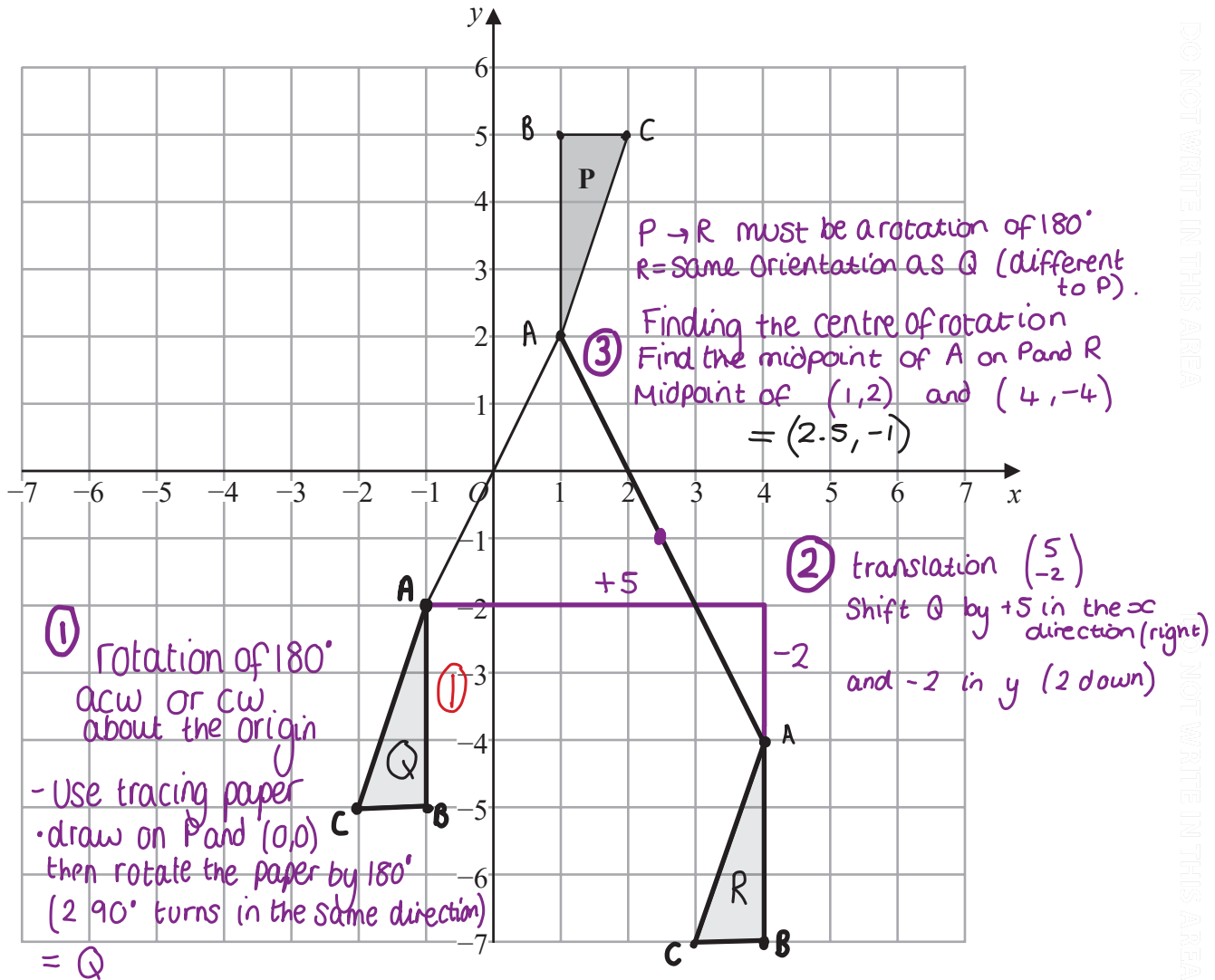


Describe fully the single transformation that maps triangle A onto triangle B.

Enlargement by scale factor -1.5 centre $(1, 1)$

(Total for Question is 2 marks)

10. The diagram shows a triangle **P** on a grid.



- ① Triangle **P** is rotated 180° about (0, 0) to give triangle **Q**.
- ② Triangle **Q** is translated by $\begin{pmatrix} 5 \\ -2 \end{pmatrix}$ to give triangle **R**.
- ③ (a) Describe fully the single transformation that maps triangle **P** onto triangle **R**.

Rotation of 180° ① about (2.5, -1) ①

OR Enlargement by scale factor -1, centre (2.5, -1) (3)

Under the transformation that maps triangle **P** onto triangle **R**, the point **A** is invariant.

(b) Write down the coordinates of point **A**.

↑ stays as the same point

Centre of rotation \rightarrow (2.5 , -1) ①
= the only point that doesn't change when the 180° rotation occurs
(Total for Question is 4 marks)