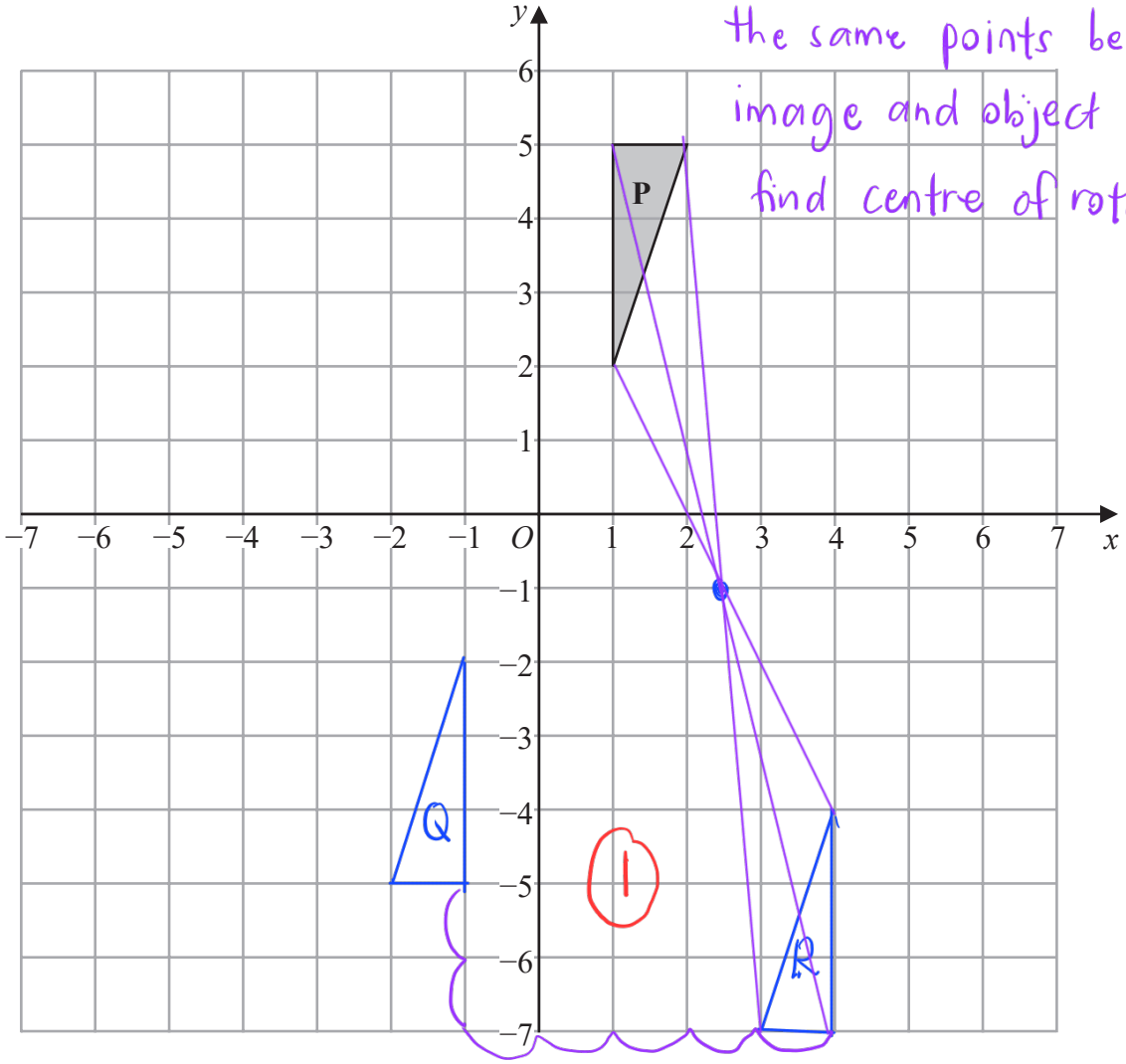
1 The diagram shows a triangle **P** on a grid.

Draw lines to connect the same points between image and object to find centre of rotation



Triangle **P** is rotated 180° about (0, 0) to give triangle **Q**.

Triangle **Q** is translated by $\begin{pmatrix} 5 \\ -2 \end{pmatrix}$ (x, y) to give triangle **R**.

(a) Describe fully the single transformation that maps triangle **P** onto triangle **R**.

Rotation 180° with centre of rotation (2.5, −1)

2

.....

.....

(3)

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

(b) Write down the coordinates of point A.

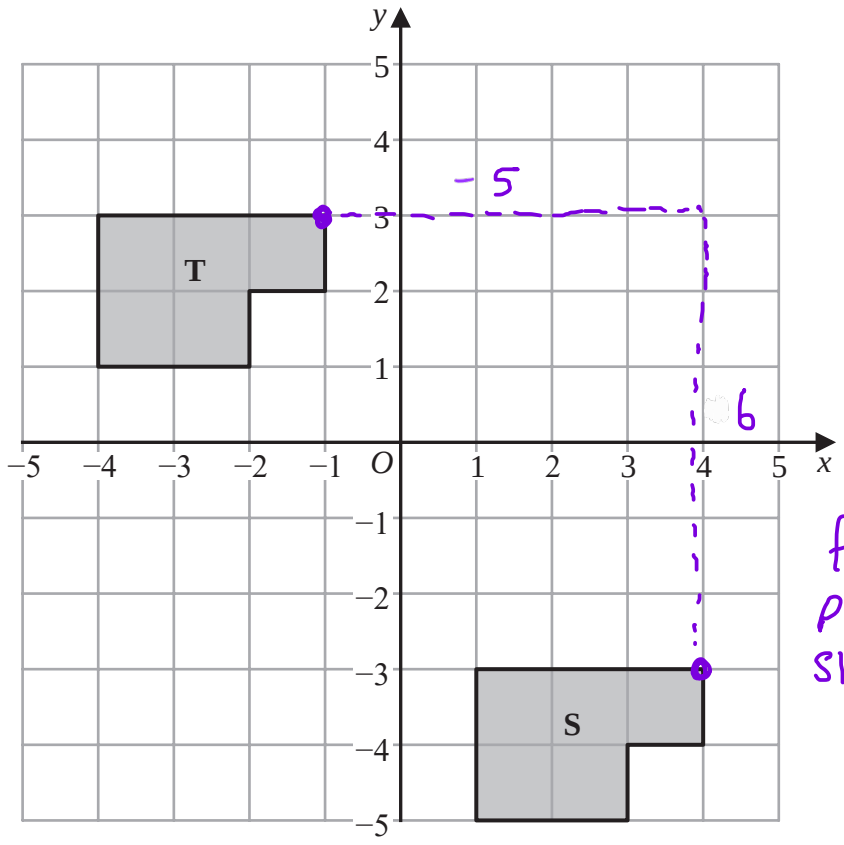
(2.5 , −1)

1

(1)

(Total for Question 1 is 4 marks)

2



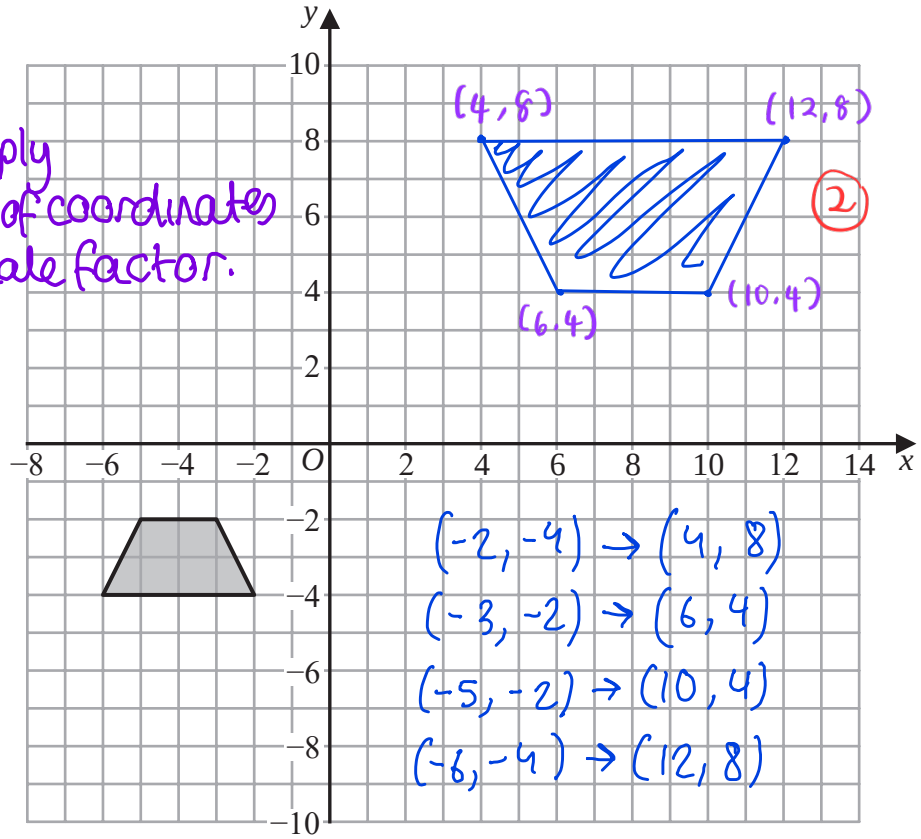
follow the path of a single vertex:

Describe fully the single transformation that maps shape **S** onto shape **T**.

translation by vector $\begin{pmatrix} -5 \\ 6 \end{pmatrix}$ (1) (1)

(Total for Question 2 is 2 marks)

3



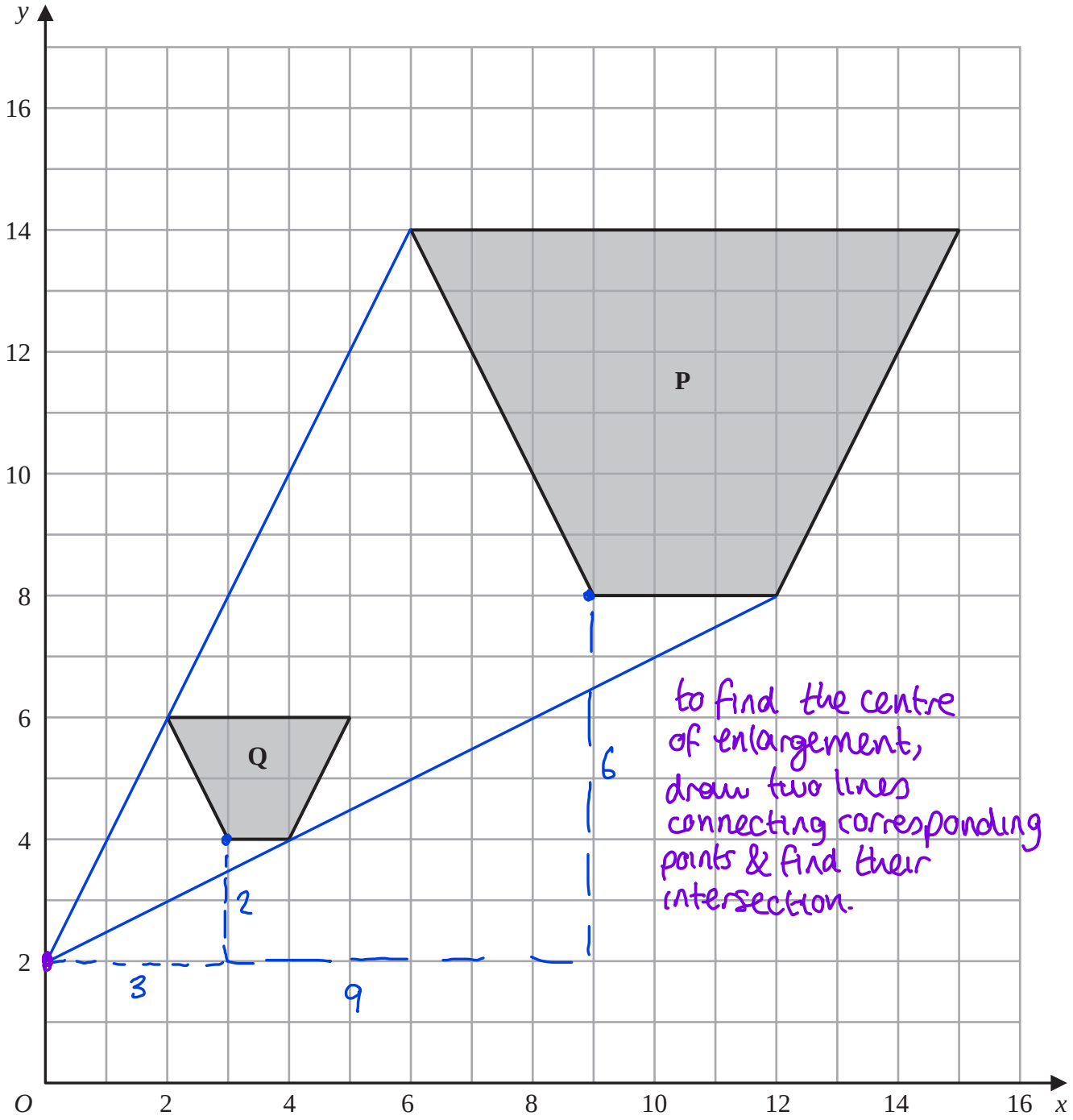
tip: multiply each set of coordinates by the scale factor.

2

Enlarge the shaded shape by scale factor −2 with centre of enlargement (0, 0)

(Total for Question 3 is 2 marks)

4



Describe fully the single transformation that maps shape **P** onto shape **Q**.

Enlargement centre (0, 2) (1) scale factor $\frac{1}{3}$ (1)

Remember it's P → Q, not Q → P

(Total for Question 4 is 2 marks)

5 Shape **A** is reflected in the line with equation $x = 2$ to give shape **B**.
Shape **B** is reflected in the line with equation $x = 6$ to give shape **C**.

Describe fully the **single** transformation that maps shape **A** onto shape **C**.

the point (x, y) is transformed to $(2a - x, y)$ under reflection in the line $x = a$.

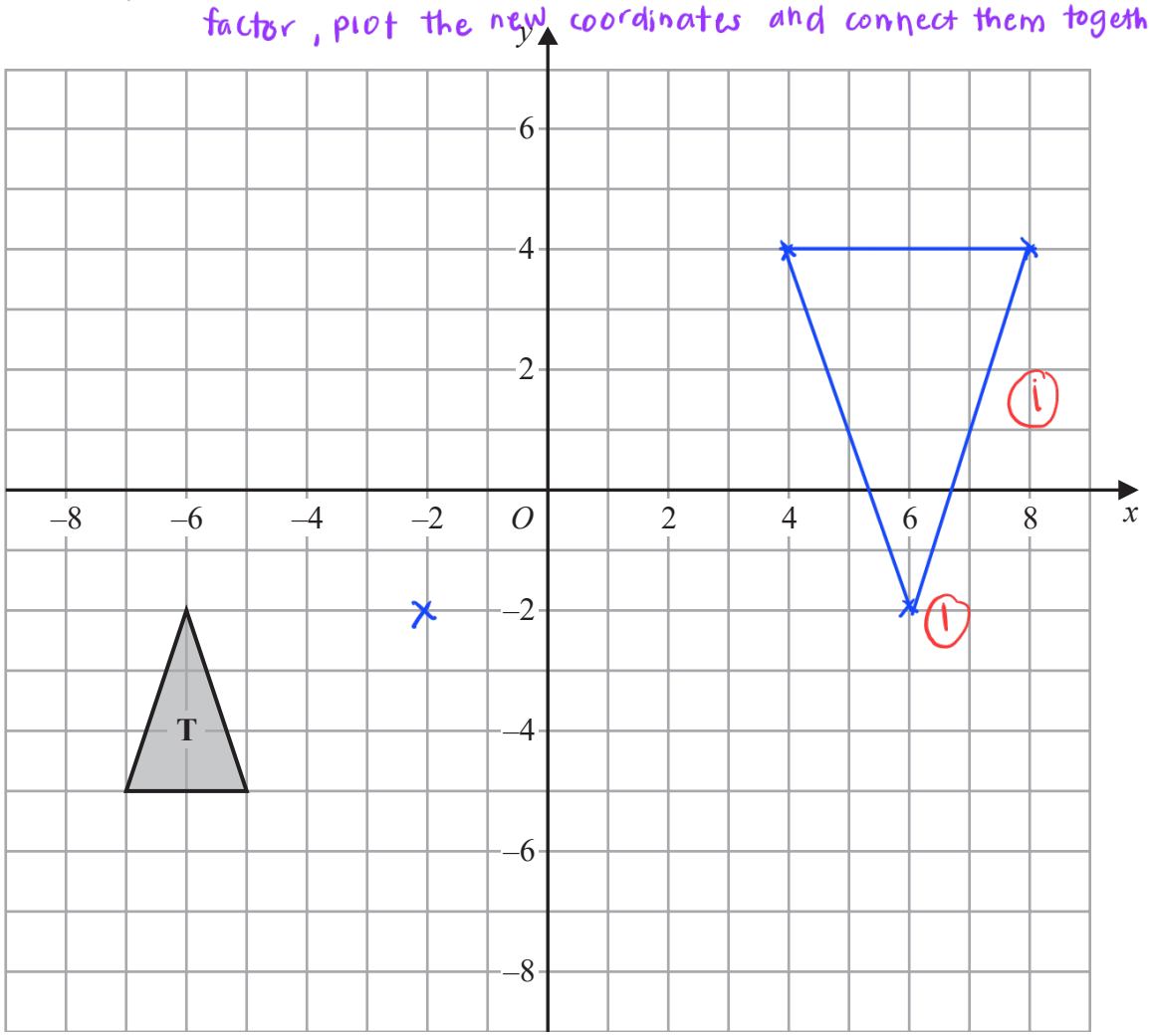
so $(x, y) \xrightarrow{x=2} (4 - x, y) \xrightarrow{x=6} (x + 8, y)$

Translation (1) by vector $\begin{pmatrix} 8 \\ 0 \end{pmatrix}$ (1)

(Total for Question 5 is 2 marks)

6

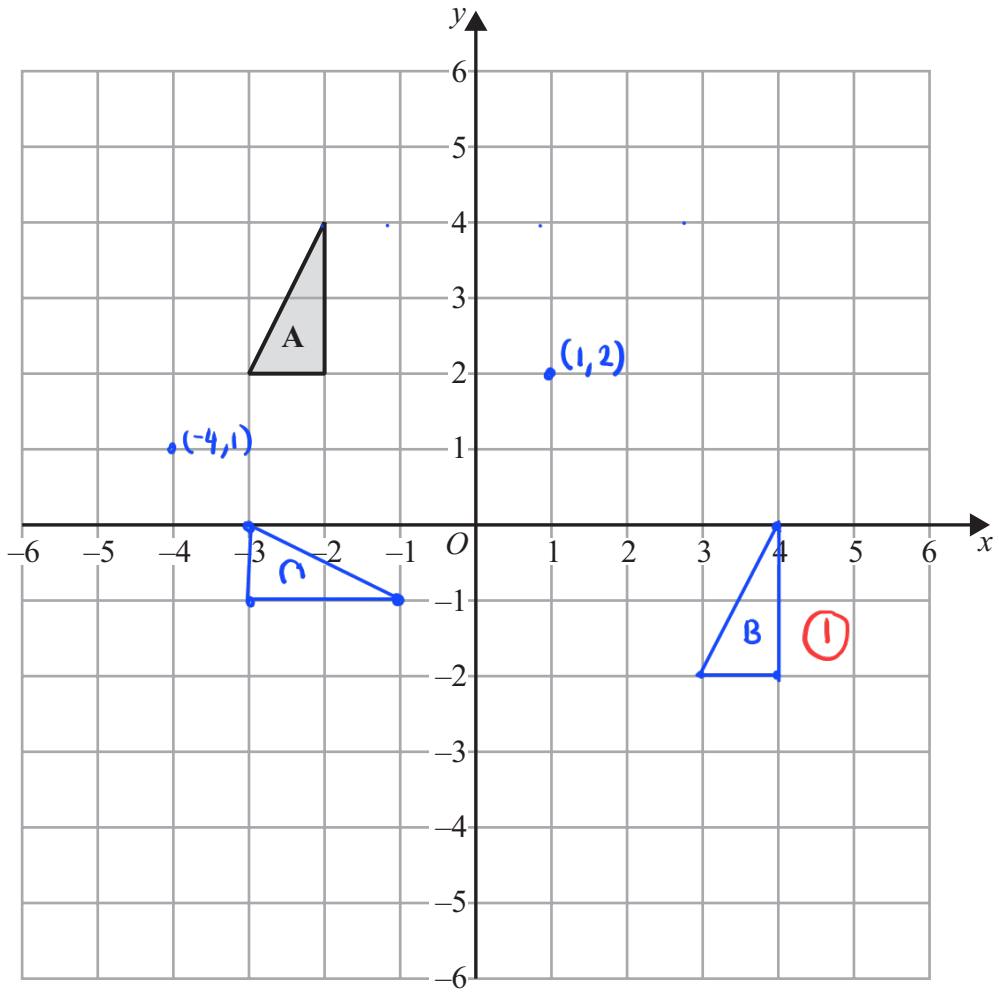
Tips: Multiply the coordinates of the original shape by the scale factor, plot the new coordinates and connect them together.



On the grid, enlarge triangle **T** by scale factor –2 with centre of enlargement (–2, –2)

(Total for Question 6 is 2 marks)

7



Triangle **A** is translated by the vector $\begin{pmatrix} 6 \\ -4 \end{pmatrix}$ to give triangle **B**.

Triangle **B** is rotated 90° clockwise about the point (1, 2) to give triangle **C**.

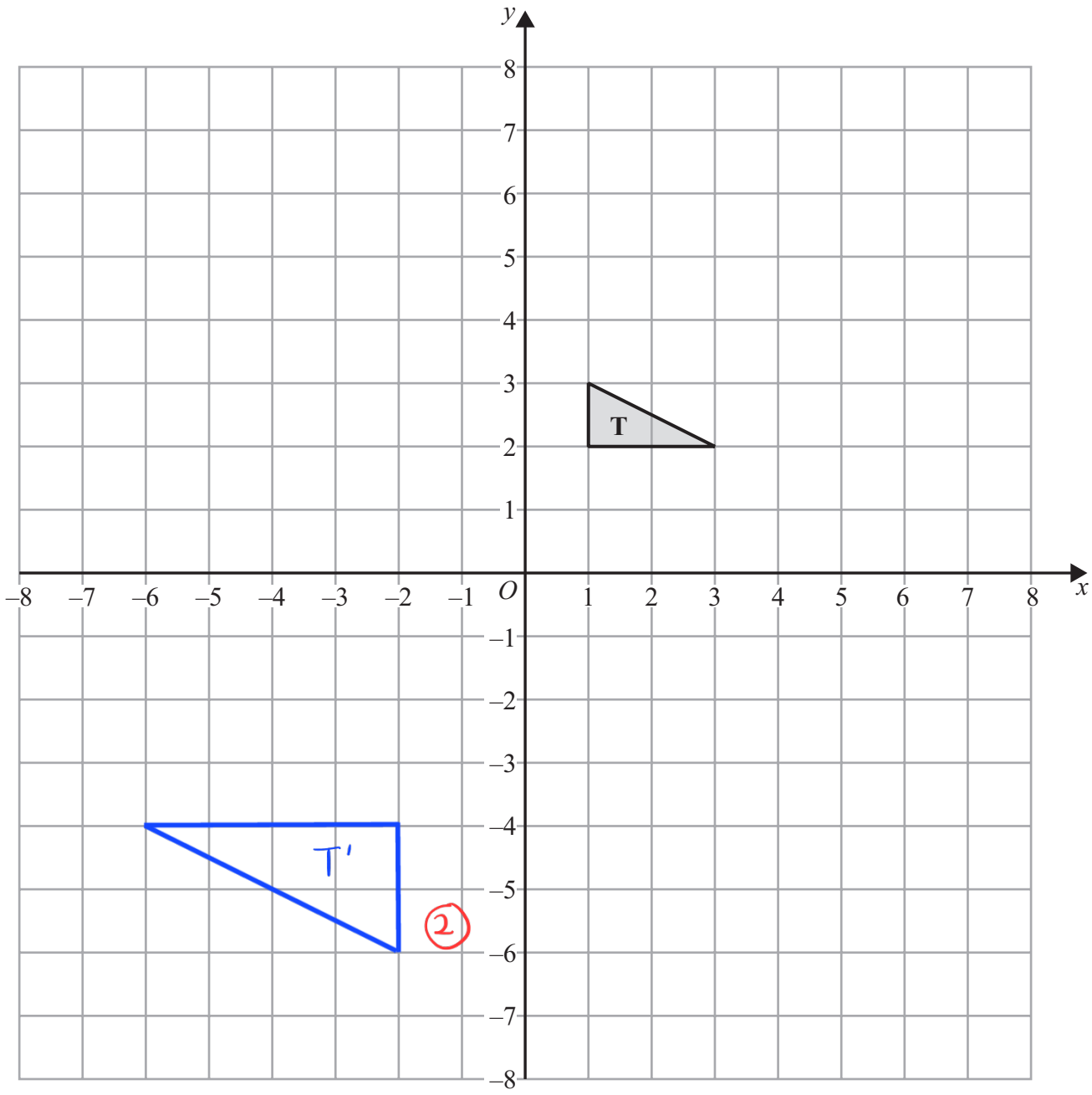
Describe fully the single transformation that maps triangle **A** onto triangle **C**.

Rotation of 90° clockwise at point (-4, 1)

(2)

(Total for Question 7 is 3 marks)

8 The diagram shows triangle **T** drawn on a grid.



Enlarge triangle **T** by scale factor –2 with centre of enlargement (0, 0)

(Total for Question 8 is 2 marks)