**GCSE · Edexcel · Maths**

2 hours  60 questions

Exam Questions

# Transformations

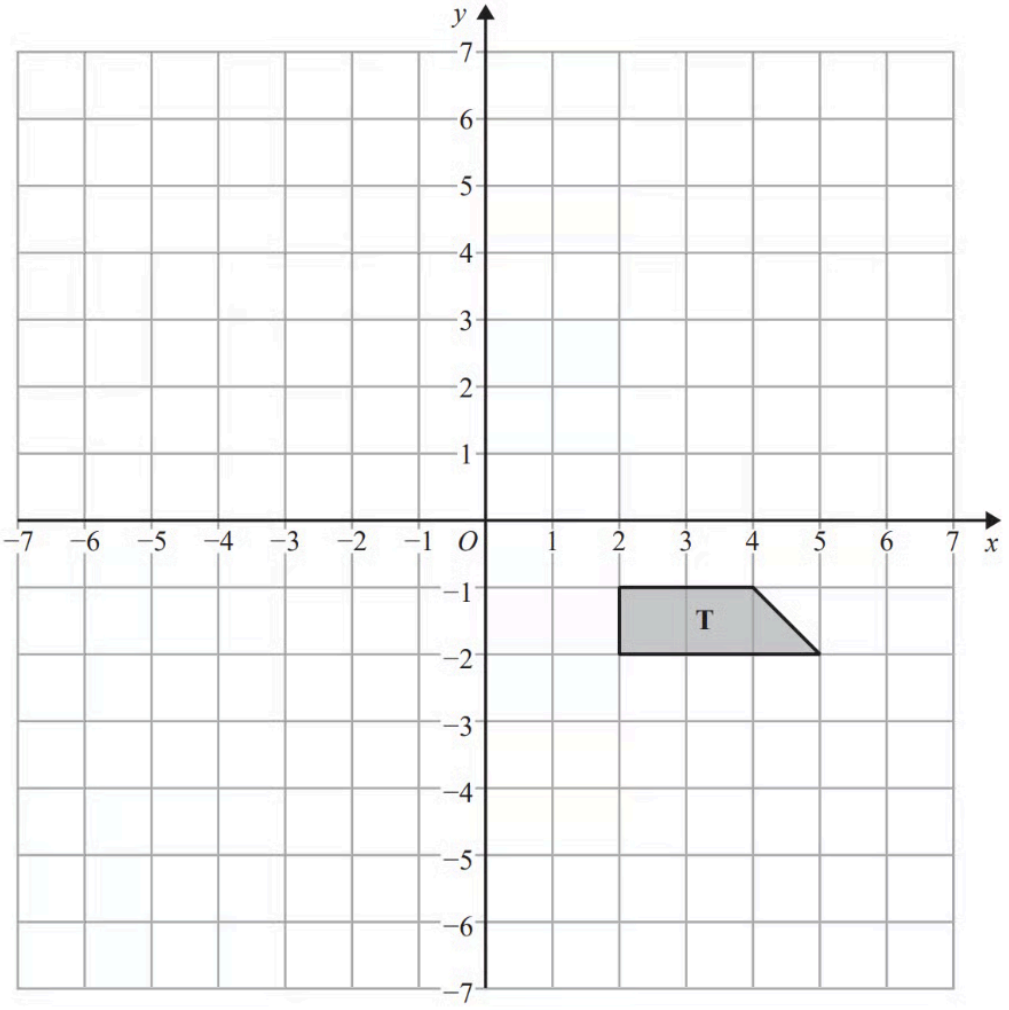
Translations / Reflections / Rotations / Enlargements / Combination of Transformations

| | |
|---|---|
| Easy (14 questions) | /29 |
| Medium (16 questions) | /50 |
| Hard (18 questions) | /39 |
| Very Hard (12 questions) | /31 |
| **Total Marks** | **/149** |

**Scan here to return to the course**
or visit savemyexams.com

# Easy Questions

**1 (a)**




Rotate trapezium **T** $180°$ about the origin.
Label the new trapezium **A**.

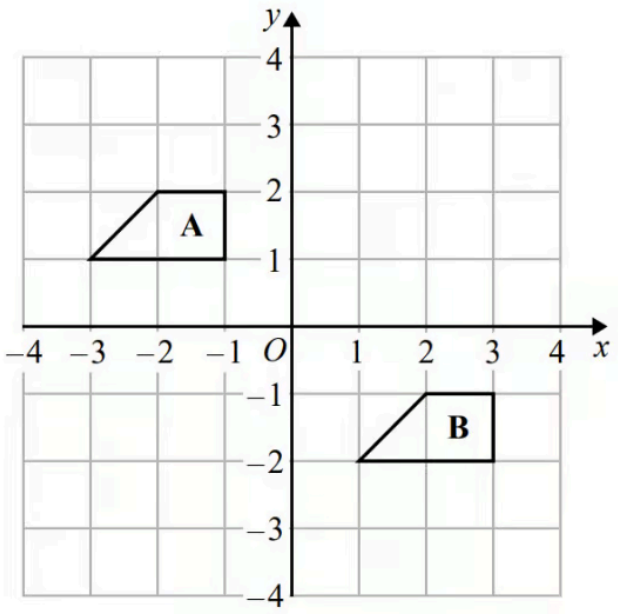
**(1 mark)**

**(b)** Translate trapezium **T** by the vector $\begin{pmatrix} -1 \\ -3 \end{pmatrix}$

Label the new trapezium **B**.

**(1 mark)**

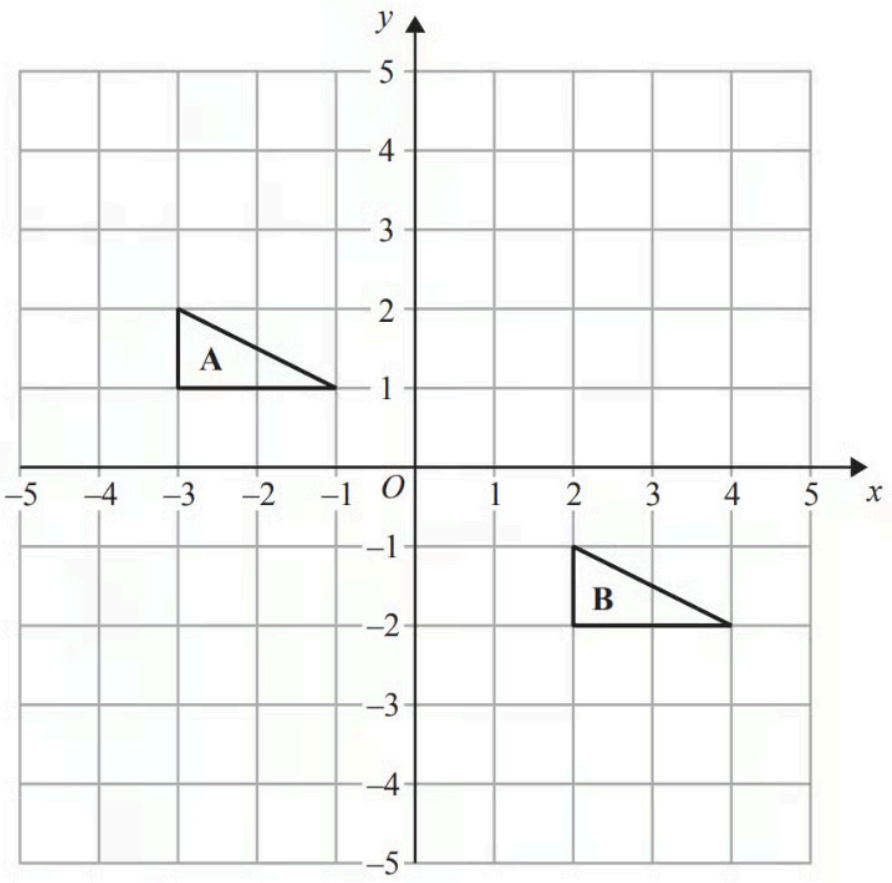
2




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

**(2 marks)**

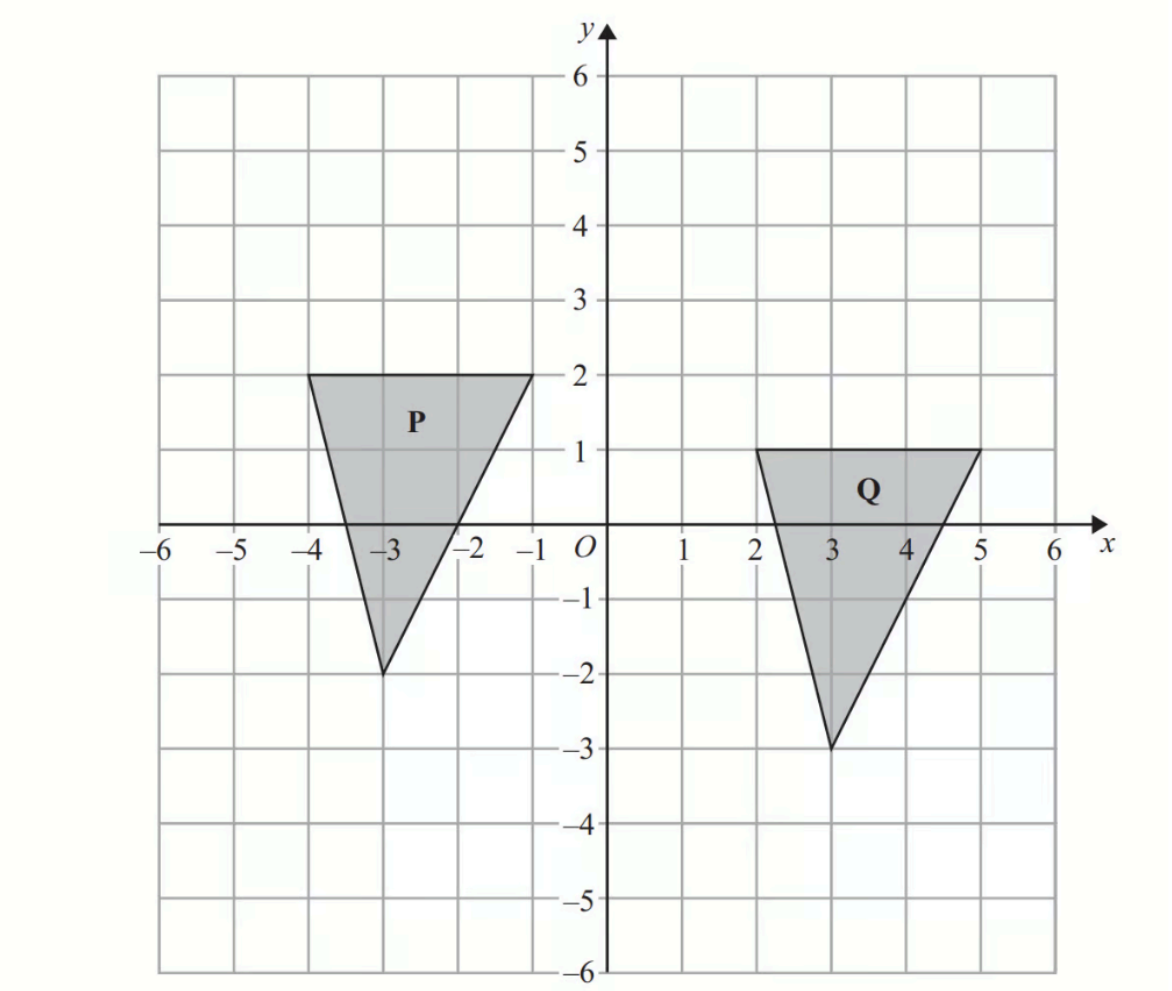
3




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

**(2 marks)**

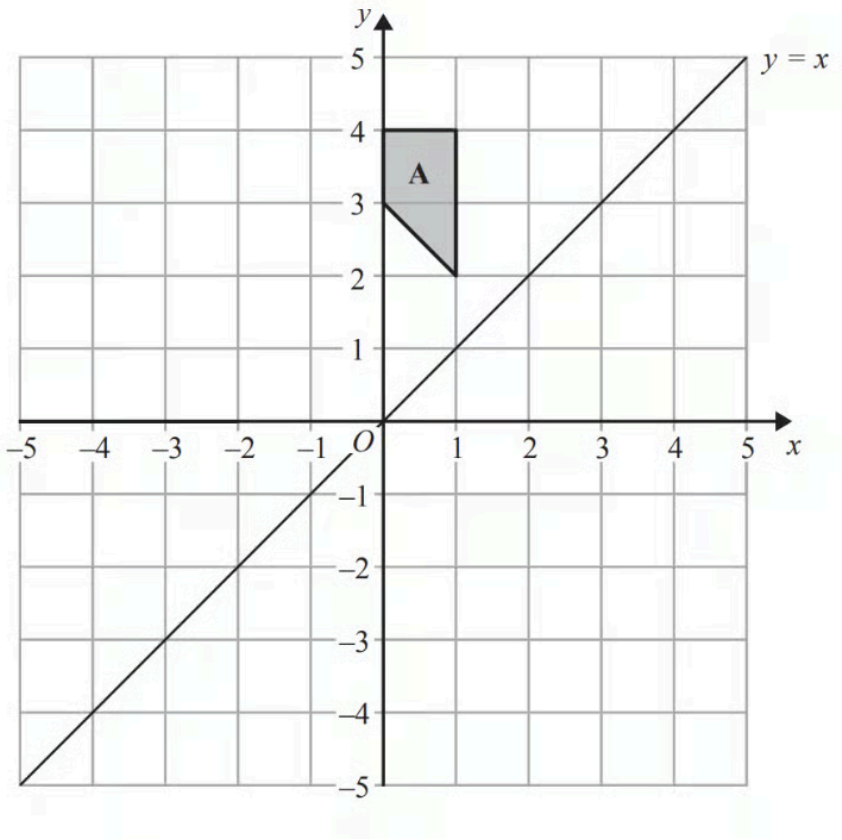
**4**




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

**(2 marks)**

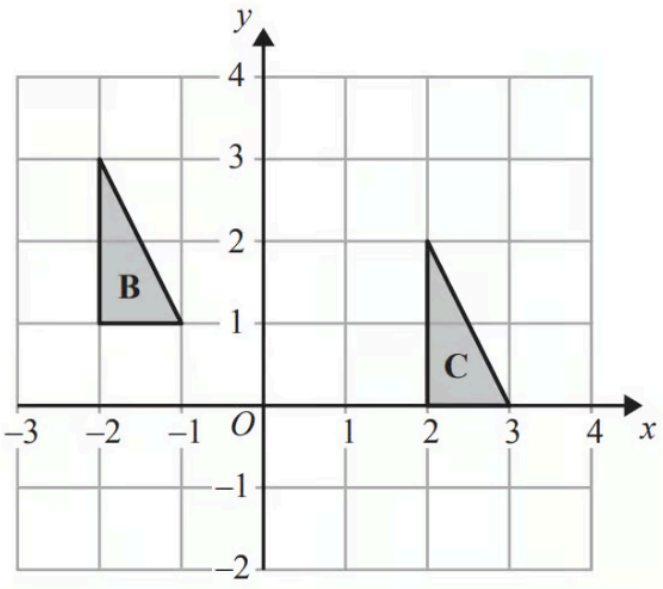
**5 (a)**




On the grid, reflect shape **A** in the line $y = x$.

**(2 marks)**

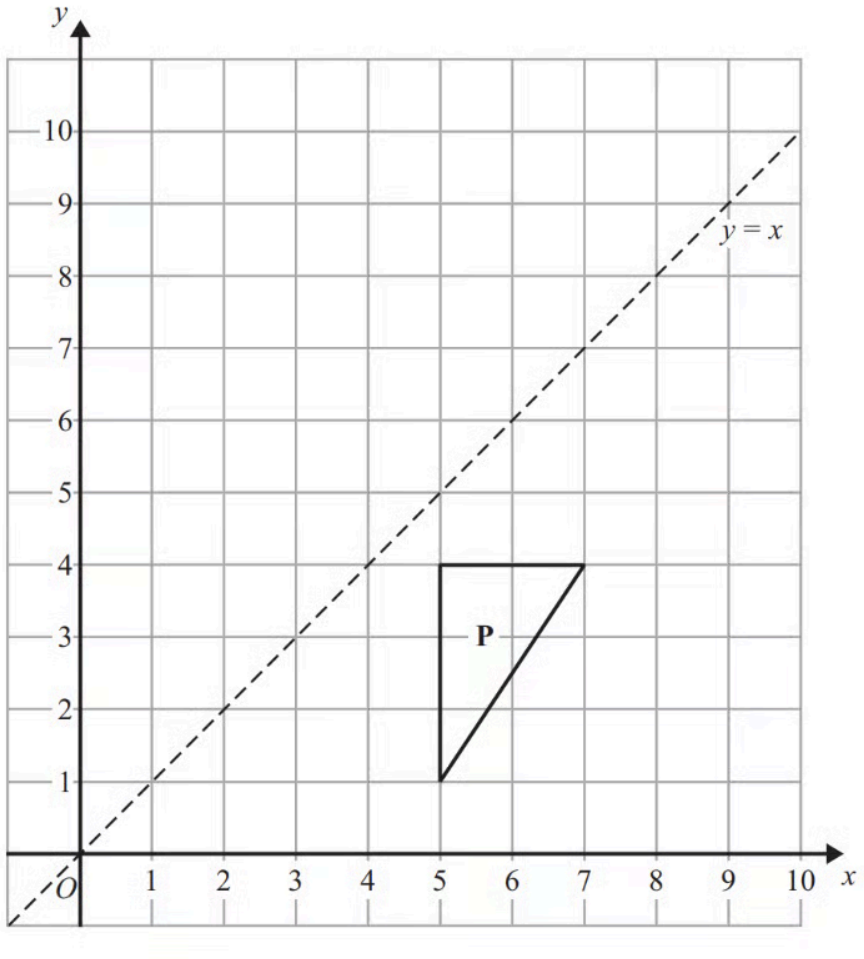
**(b)**




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

**(2 marks)**

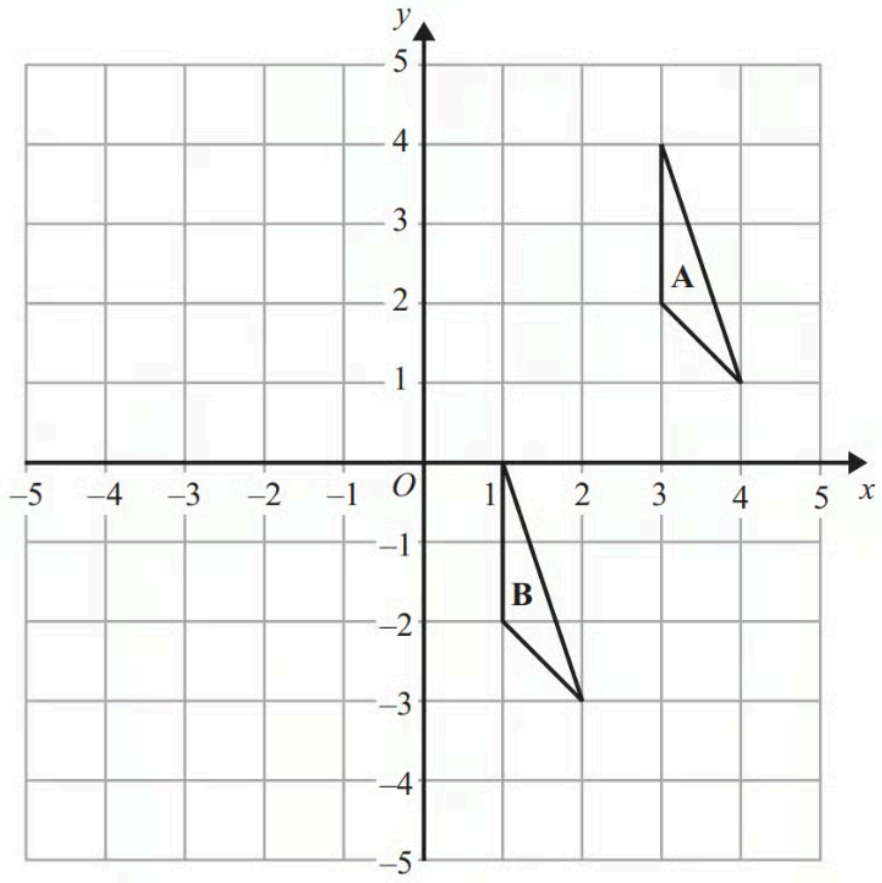
**6 (a)**




Reflect shape **P** in the line $y = x$.

**(2 marks)**

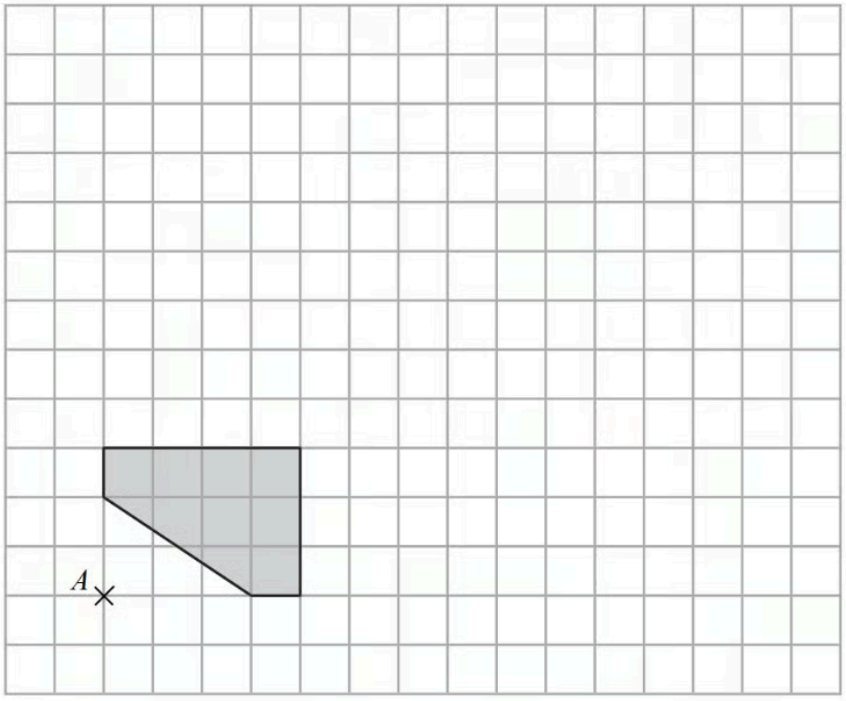
**(b)**




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

**(2 marks)**

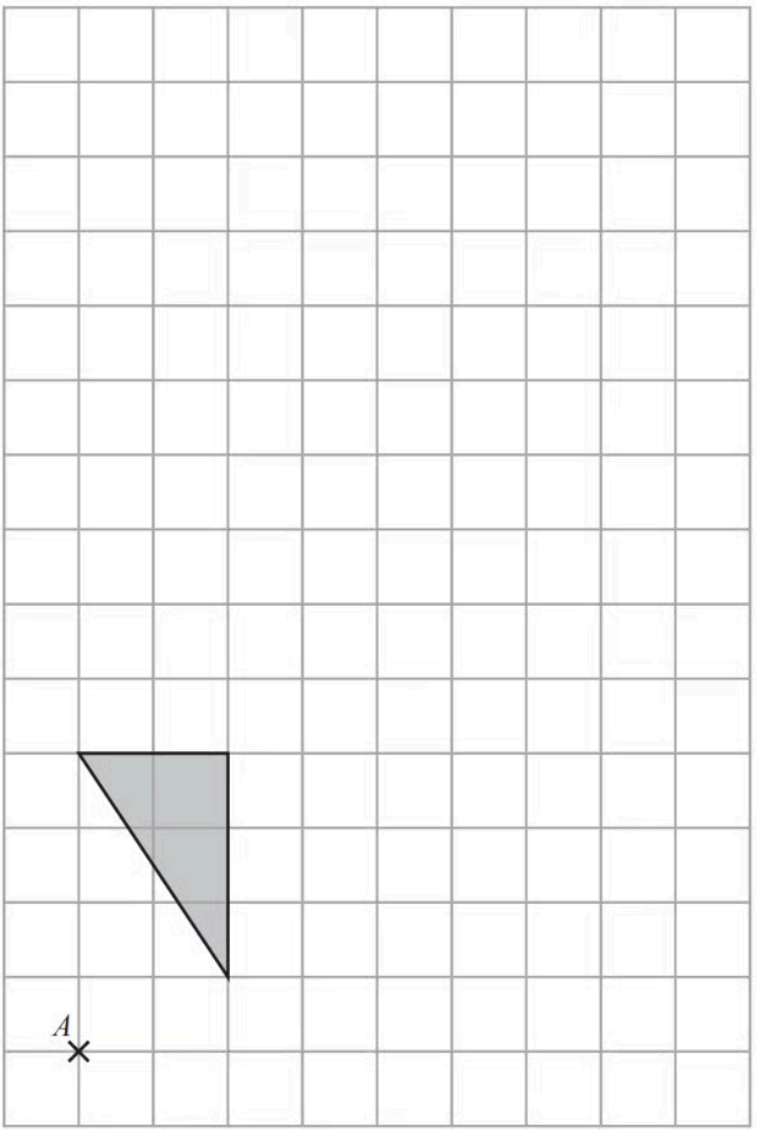
7




On the grid, enlarge the shape by scale factor 3, centre *A*.

**(3 marks)**

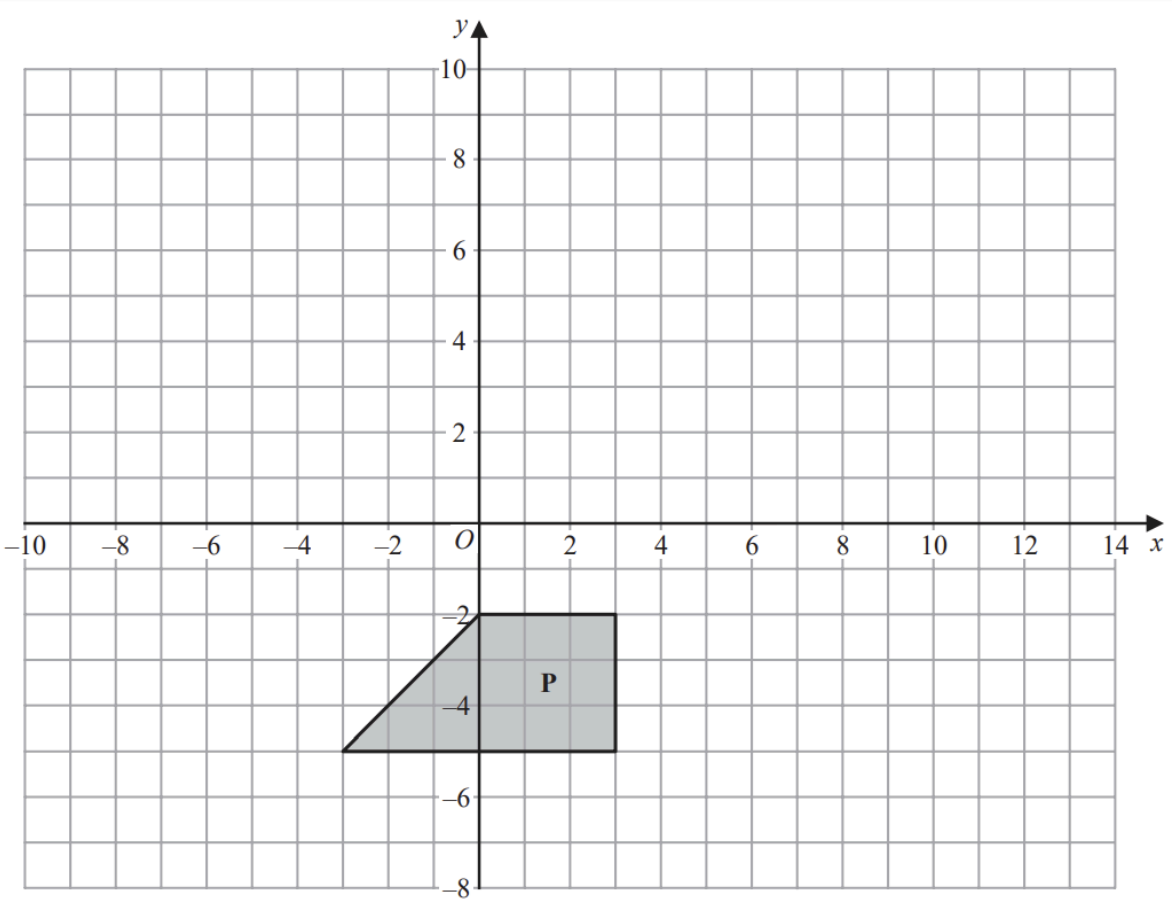
**8** A shaded shape is shown on the grid.




On the grid, enlarge the shape by a scale factor of 2, centre *A*.

**(2 marks)**

**9** Here is a shape **P** drawn on a grid of squares.

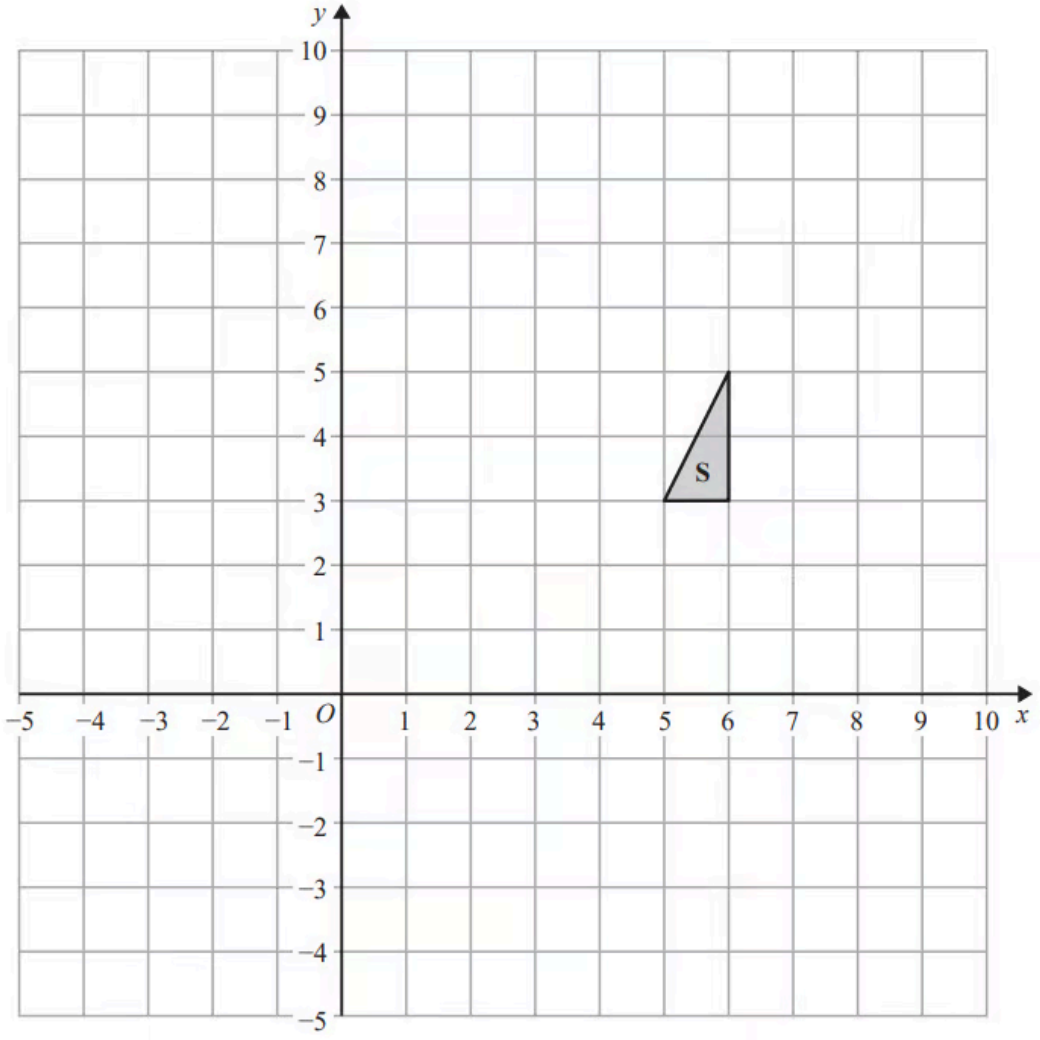



On the grid, translate shape **P** by the vector $\begin{pmatrix} 10 \\ 8 \end{pmatrix}$

Label the new shape **R**.

**(1 mark)**

**10**



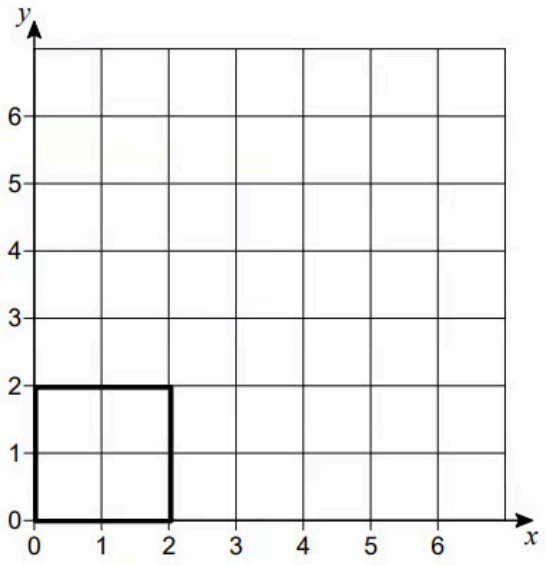

Translate triangle **S** by the vector $\begin{pmatrix} -4 \\ -6 \end{pmatrix}$

Label the new triangle **T**.

**(1 mark)**

**11** Square $OABC$ is drawn on a centimetre grid.

| | | | |
|---|---|---|---|
| $O$ is (0, 0) | $A$ is (2, 0) | $B$ is (2, 2) | $C$ is (0, 2) |




$OABC$ is translated by the vector $\begin{pmatrix} 3 \\ 1 \end{pmatrix}$

Choose the number of invariant points on the perimeter of the square.

**A.** 0

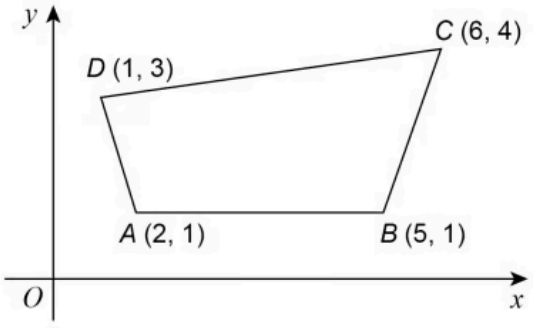
**B.** 1

**C.** 2

**D.** 4

**(1 mark)**

**12** A sketch of a quadrilateral $ABCD$ is shown.



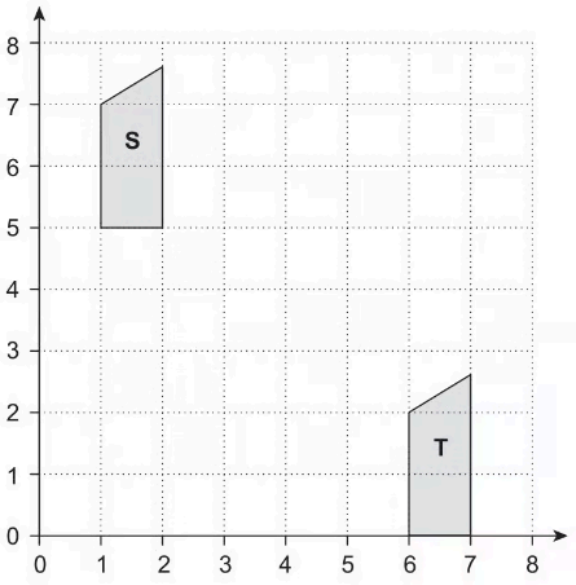

Not drawn accurately

$ABCD$ is enlarged, centre $B$, scale factor $\frac{1}{3}$

Choose the vertex that is invariant.

**(1 mark)**

**13** Here is a coordinate grid.




Shape S is translated to Shape T using vector $\begin{pmatrix} p \\ q \end{pmatrix}$

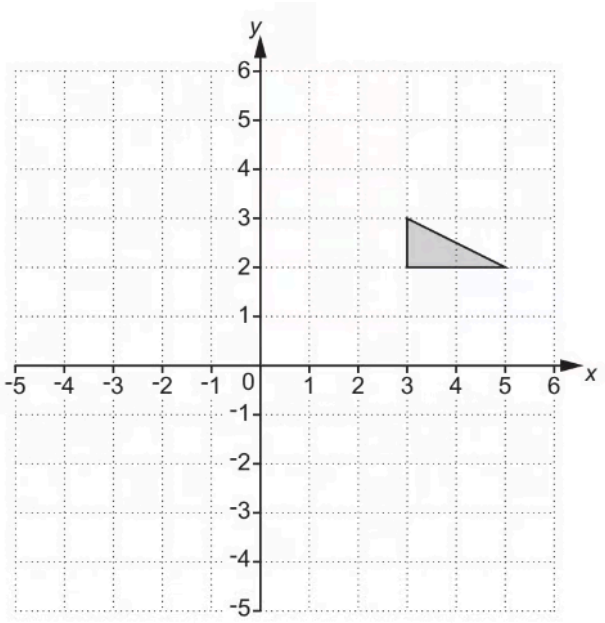
Write down the values of $p$ and $q$.

$p$ = .....

$q$ = .....

**(2 marks)**

**14** You may use this coordinate grid to help you answer the following questions.



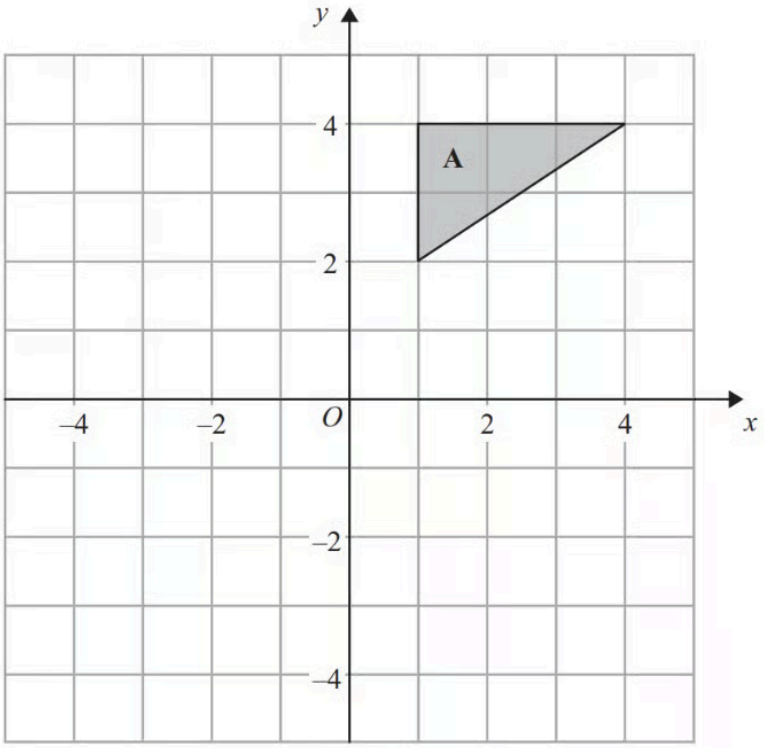

Describe fully the **single** transformation that is equivalent to

a translation of $\begin{pmatrix} -7 \\ 2 \end{pmatrix}$ followed by a translation of $\begin{pmatrix} 3 \\ -5 \end{pmatrix}$.

**(2 marks)**

# Medium Questions

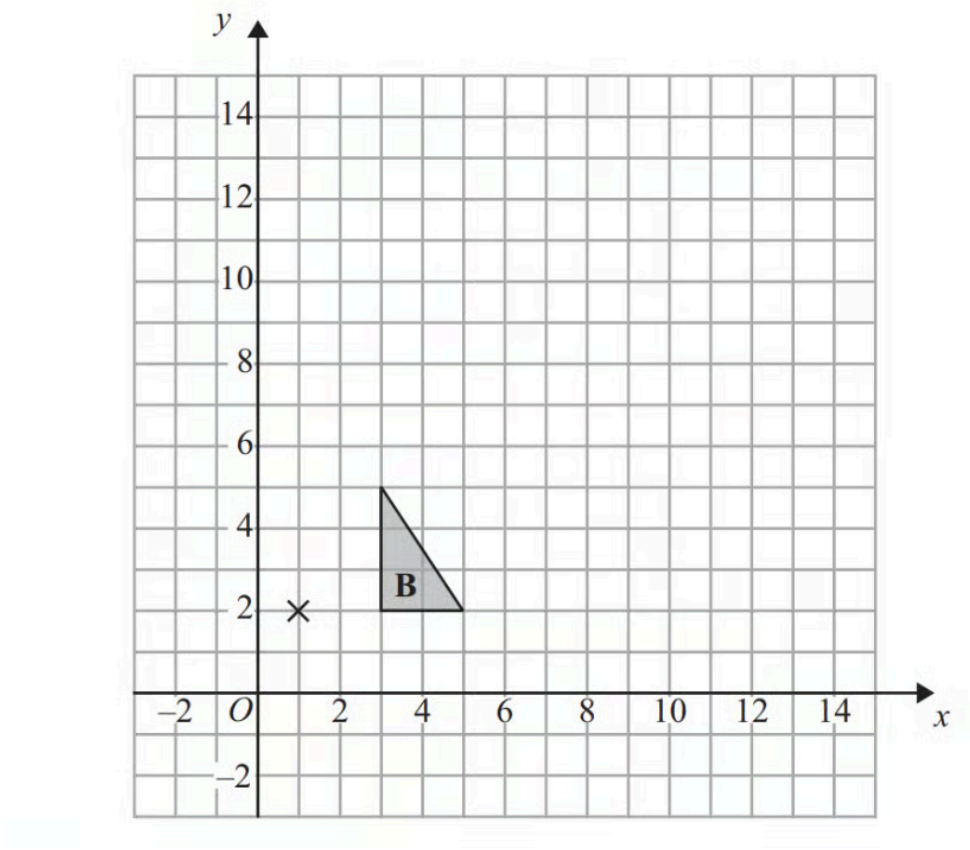
**1 (a)**




Rotate triangle **A** $90°$ clockwise, centre $O$.

**(2 marks)**

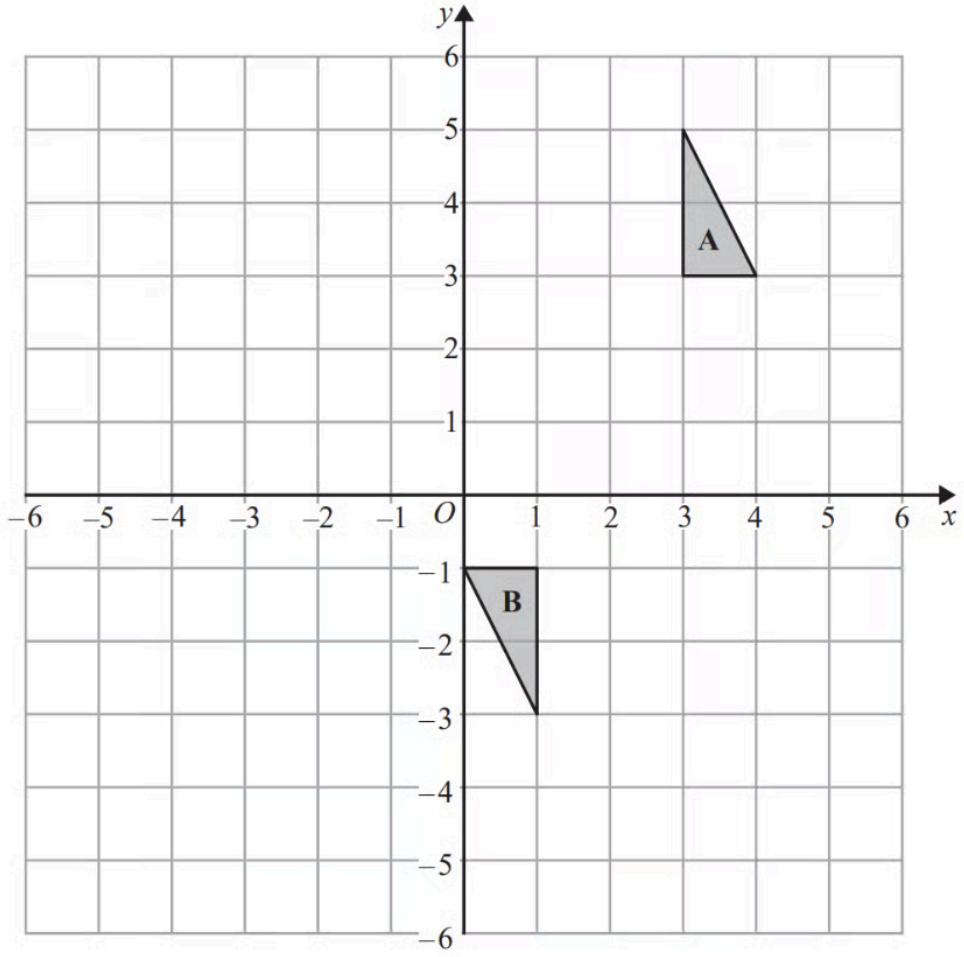
**(b)**




Enlarge triangle **B** by scale factor 3, centre (1, 2).

**(3 marks)**

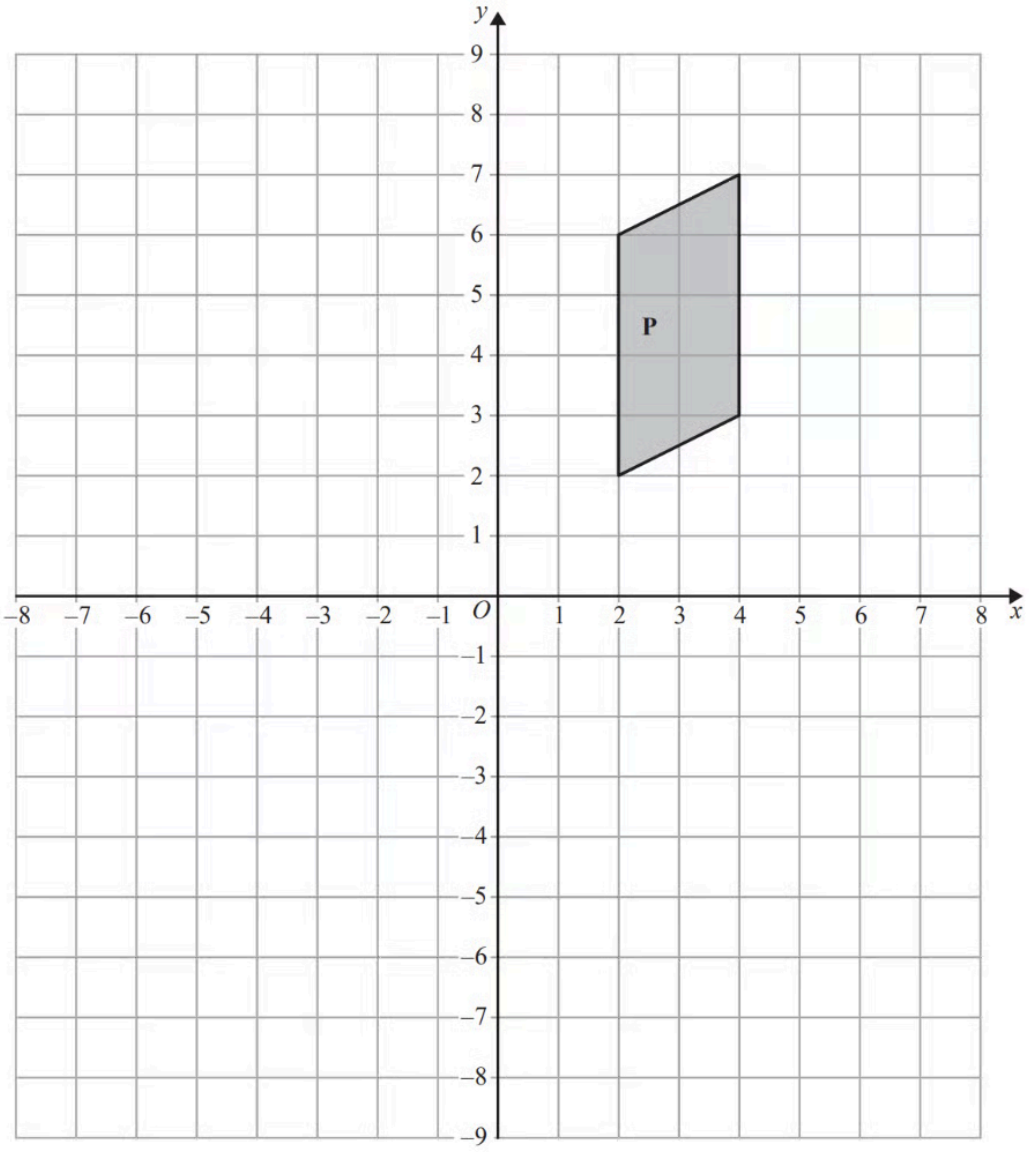
**2**




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

**(3 marks)**

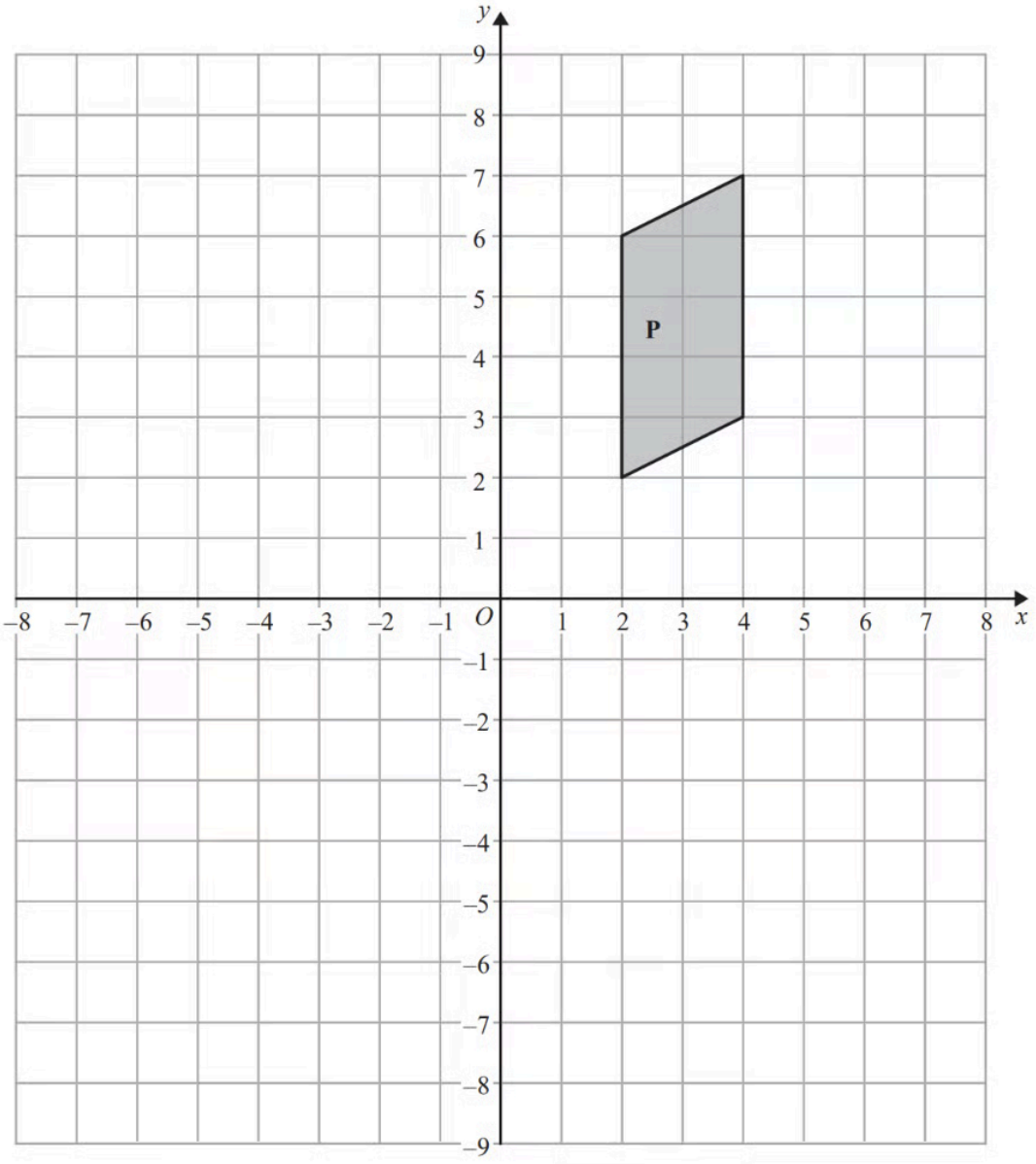
**3 (a)**




Reflect shape **P** in the line $x = -1$.

**(2 marks)**

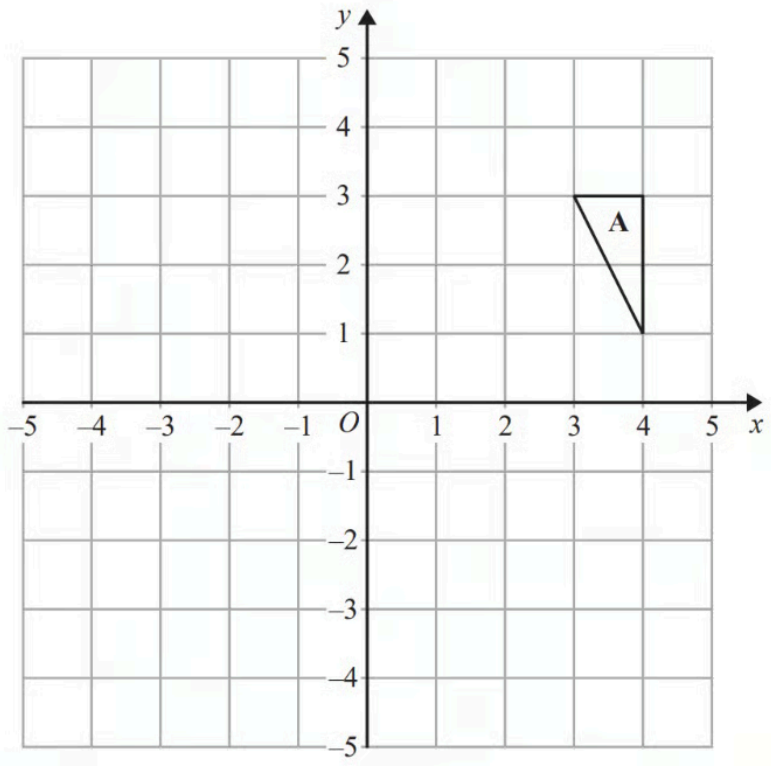
**(b)**




Rotate shape **P** $90°$ anticlockwise about (0, 1).

**(2 marks)**

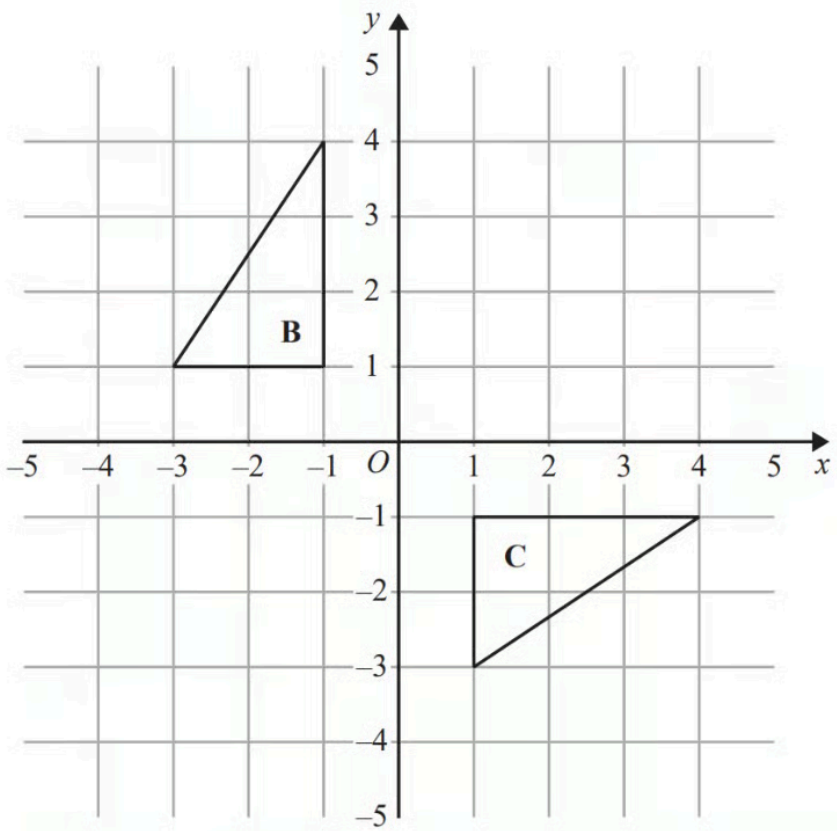
**4 (a)**




Rotate triangle **A** $90°$ anticlockwise with centre $O$.

**(2 marks)**

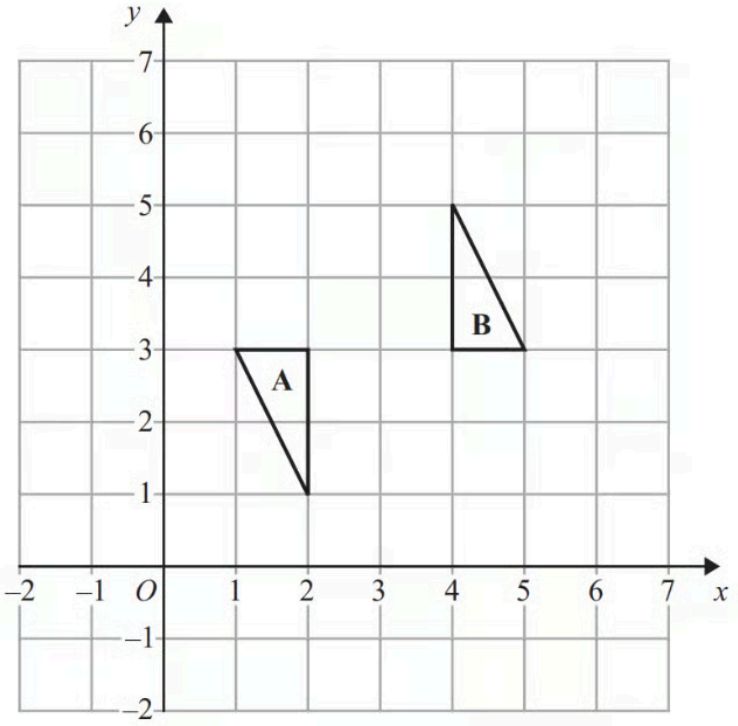
**(b)**




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

**(2 marks)**

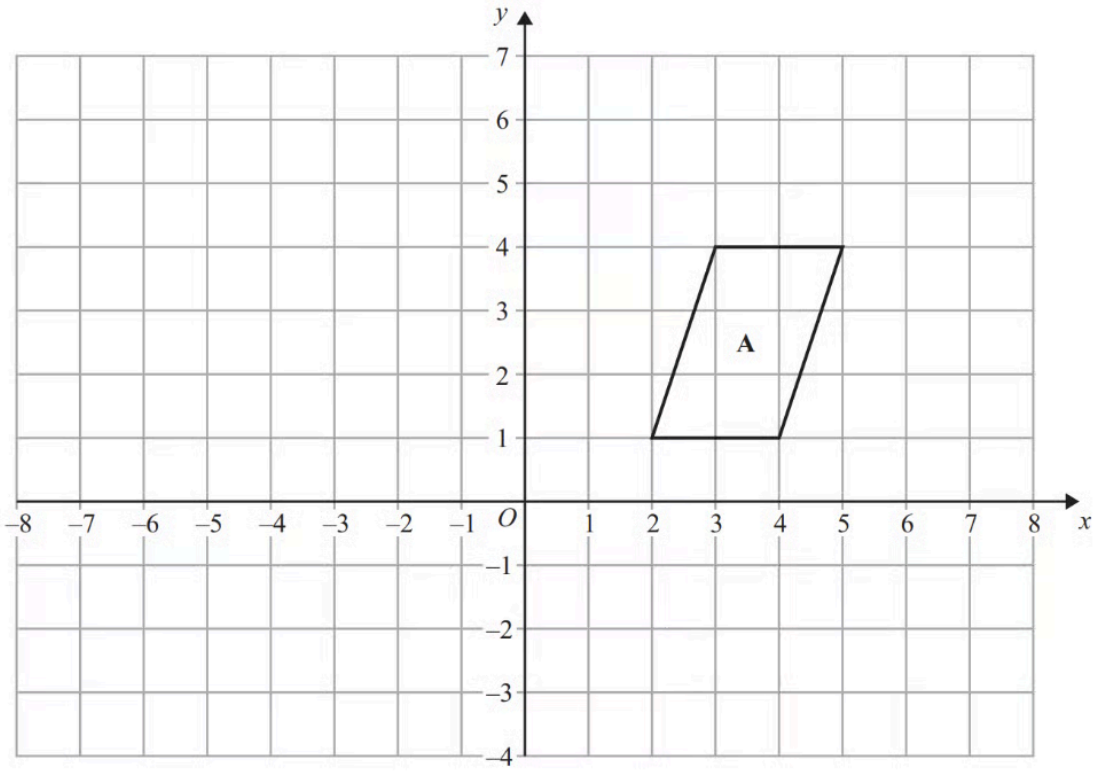
5




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

**(3 marks)**

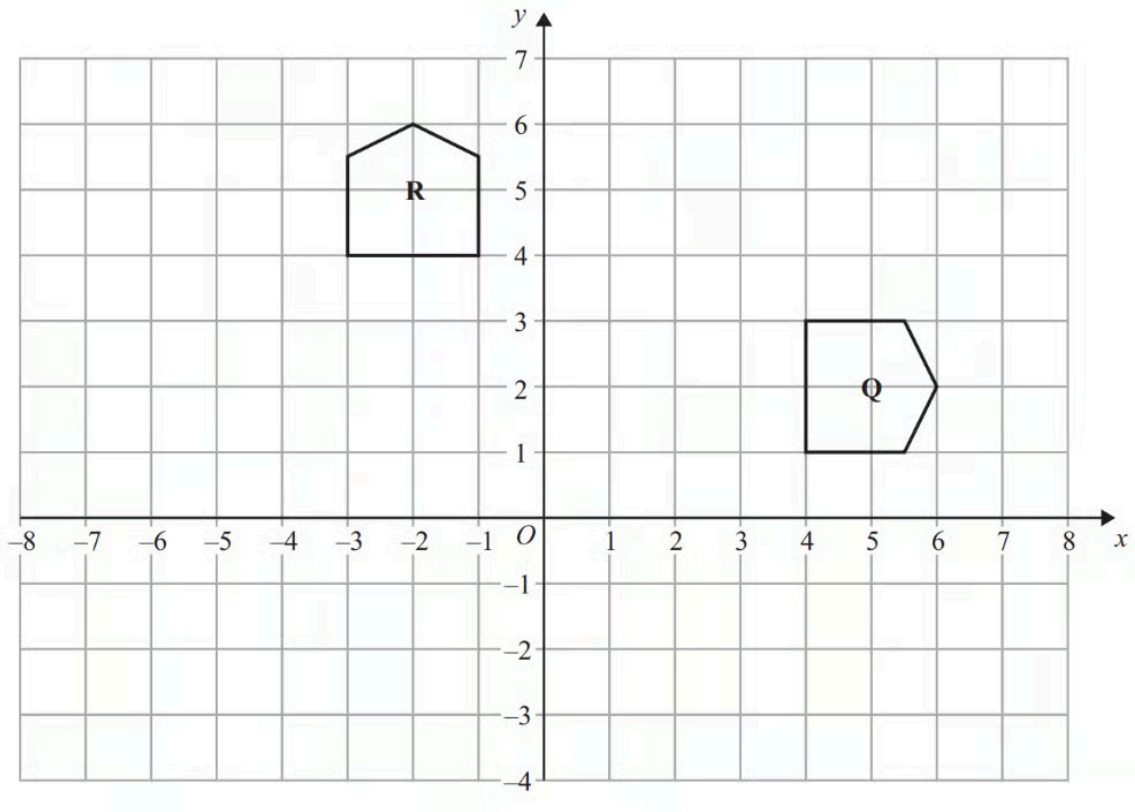
**6 (a)**




Translate shape **A** by the vector $\begin{pmatrix} -3 \\ 2 \end{pmatrix}$.

**(1 mark)**

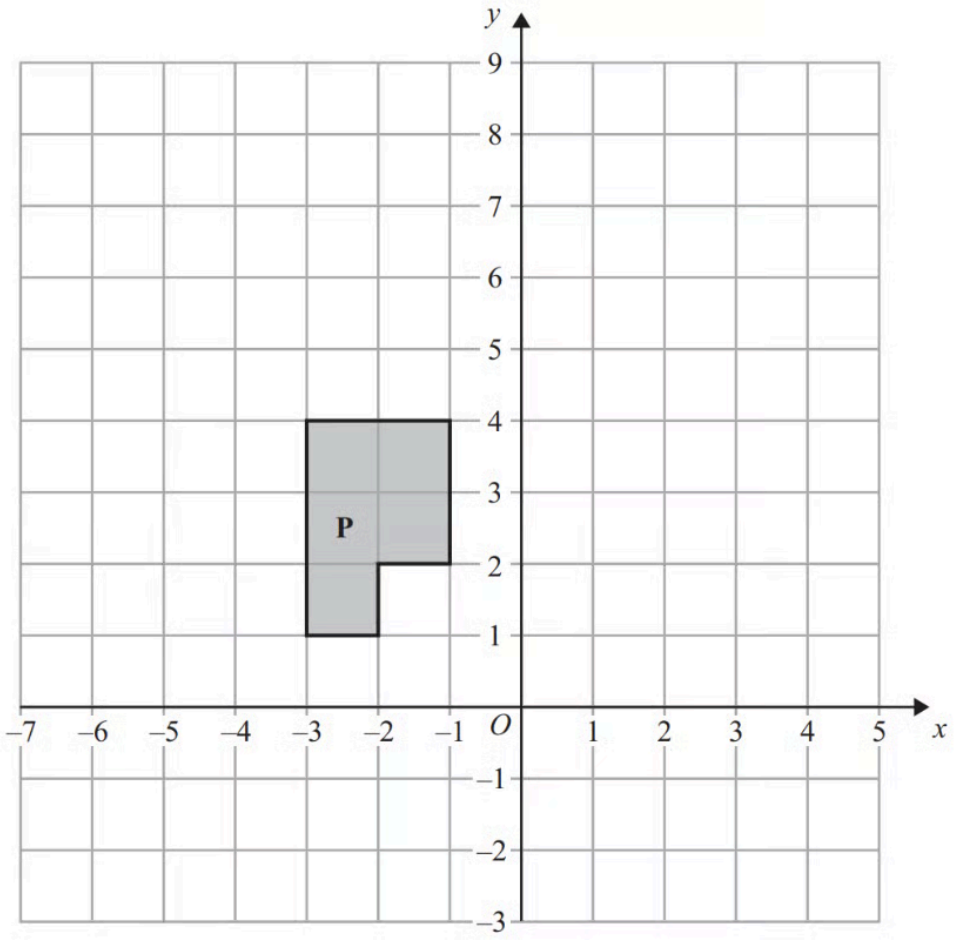
**(b)**




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

**(3 marks)**

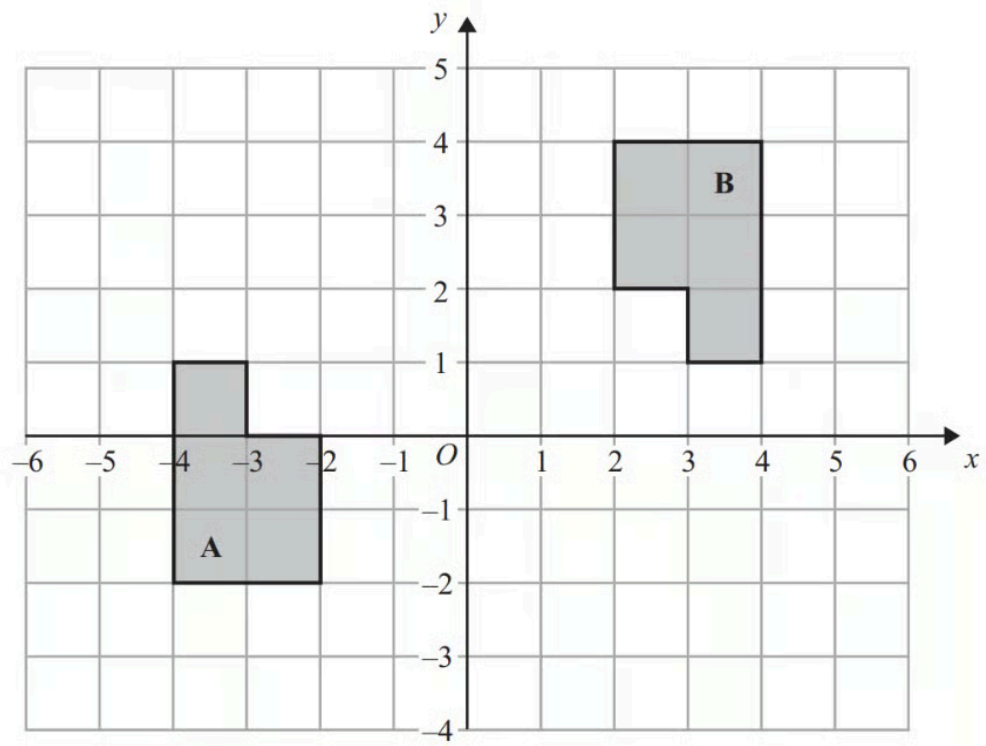
**7 (a)**




Translate shape **P** by the vector $\begin{pmatrix} 5 \\ -2 \end{pmatrix}$

**(2 marks)**

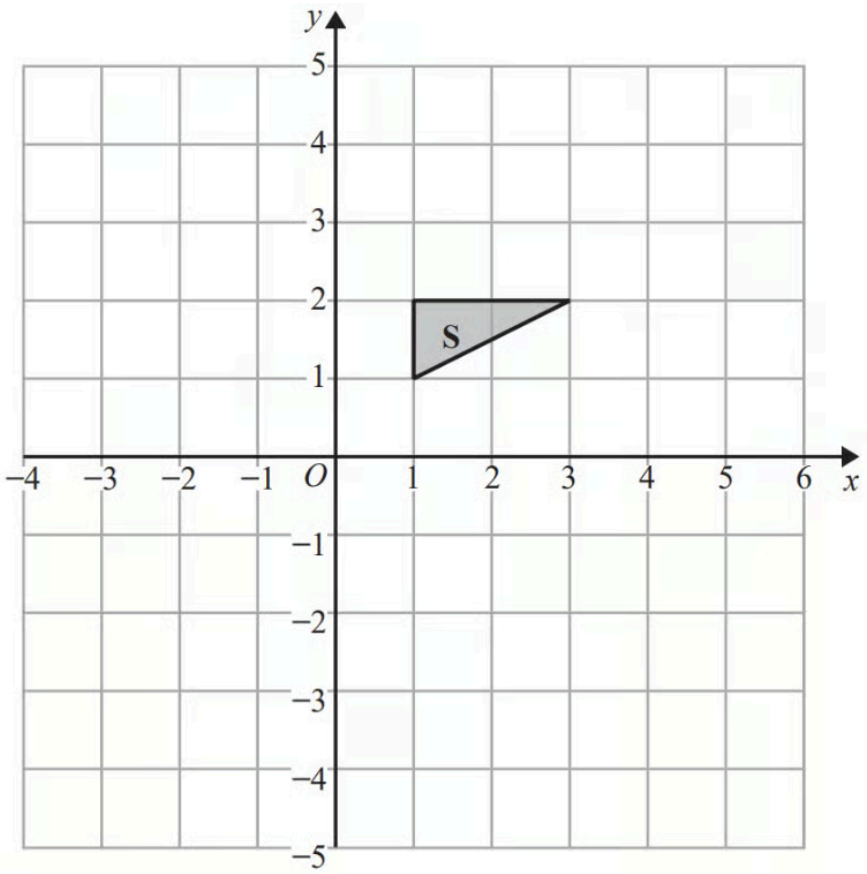
**(b)**




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

**(3 marks)**

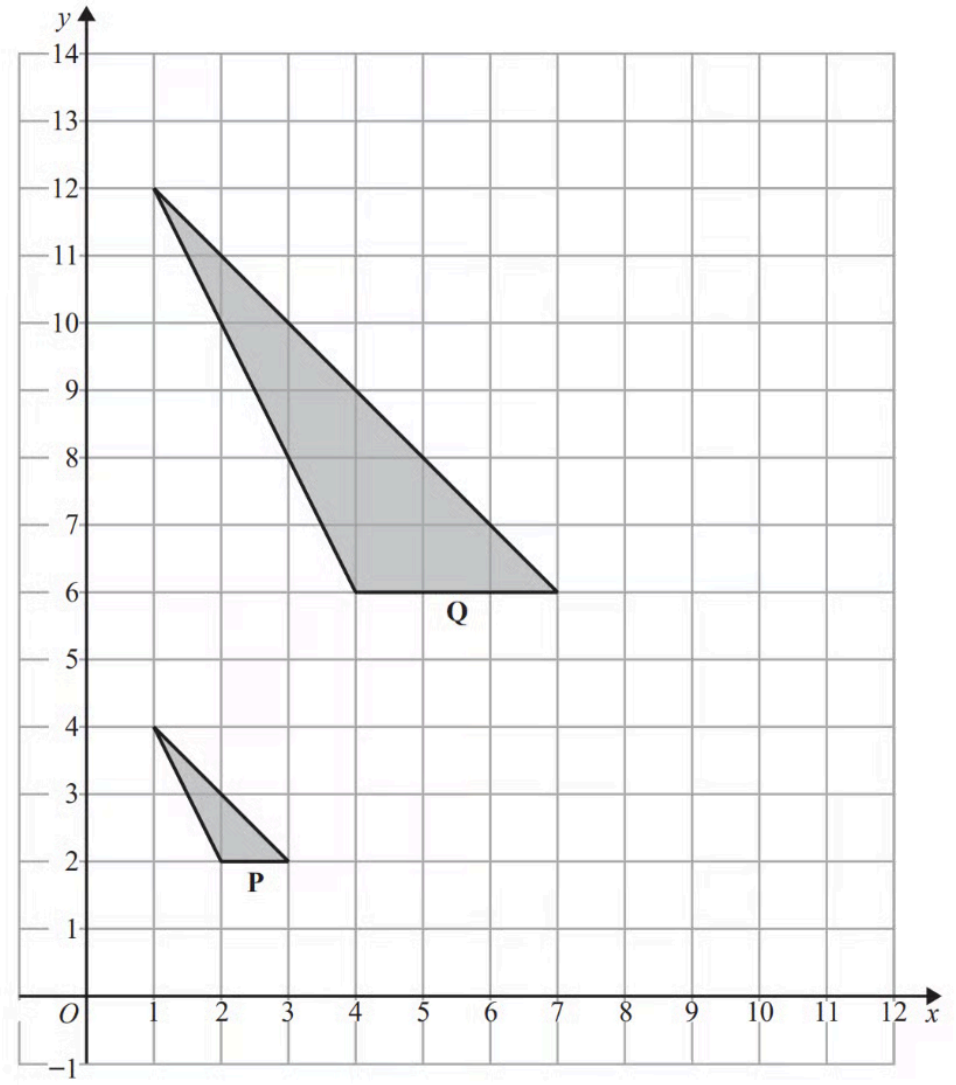
**8 (a)**




On the grid, rotate shape **S** by $90°$ anticlockwise about the origin.

**(2 marks)**

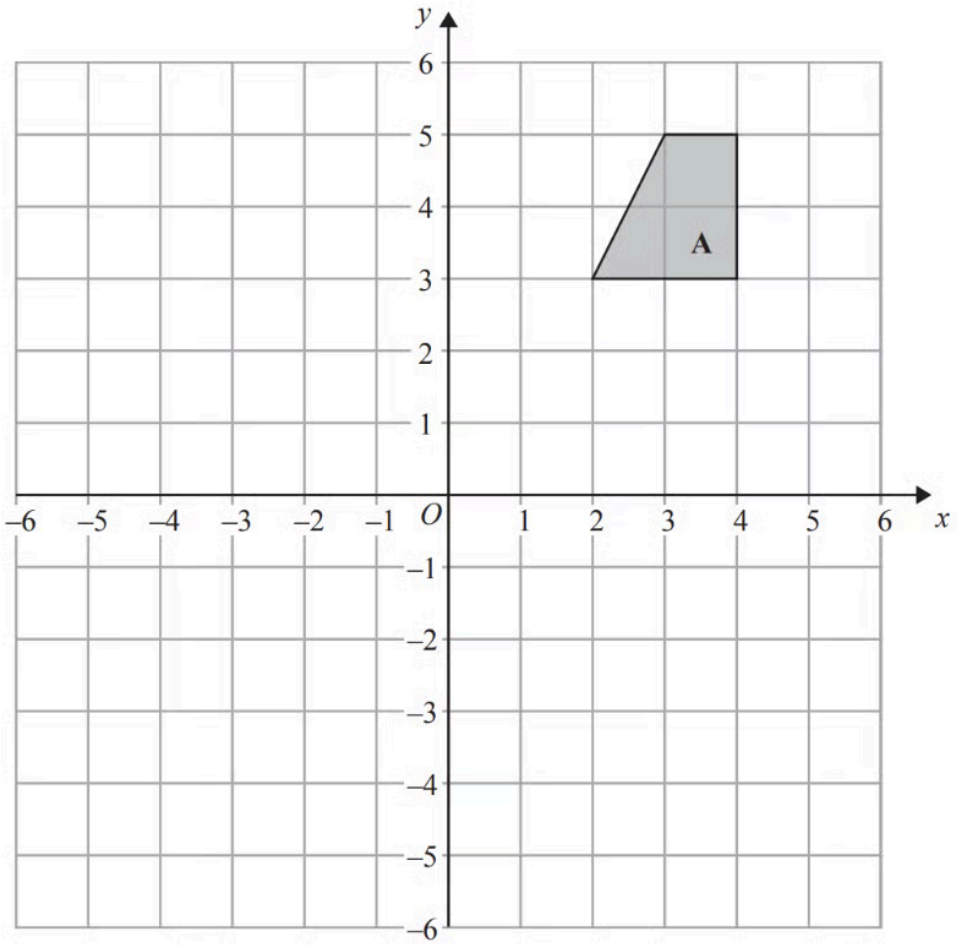
**(b)**




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

**(3 marks)**

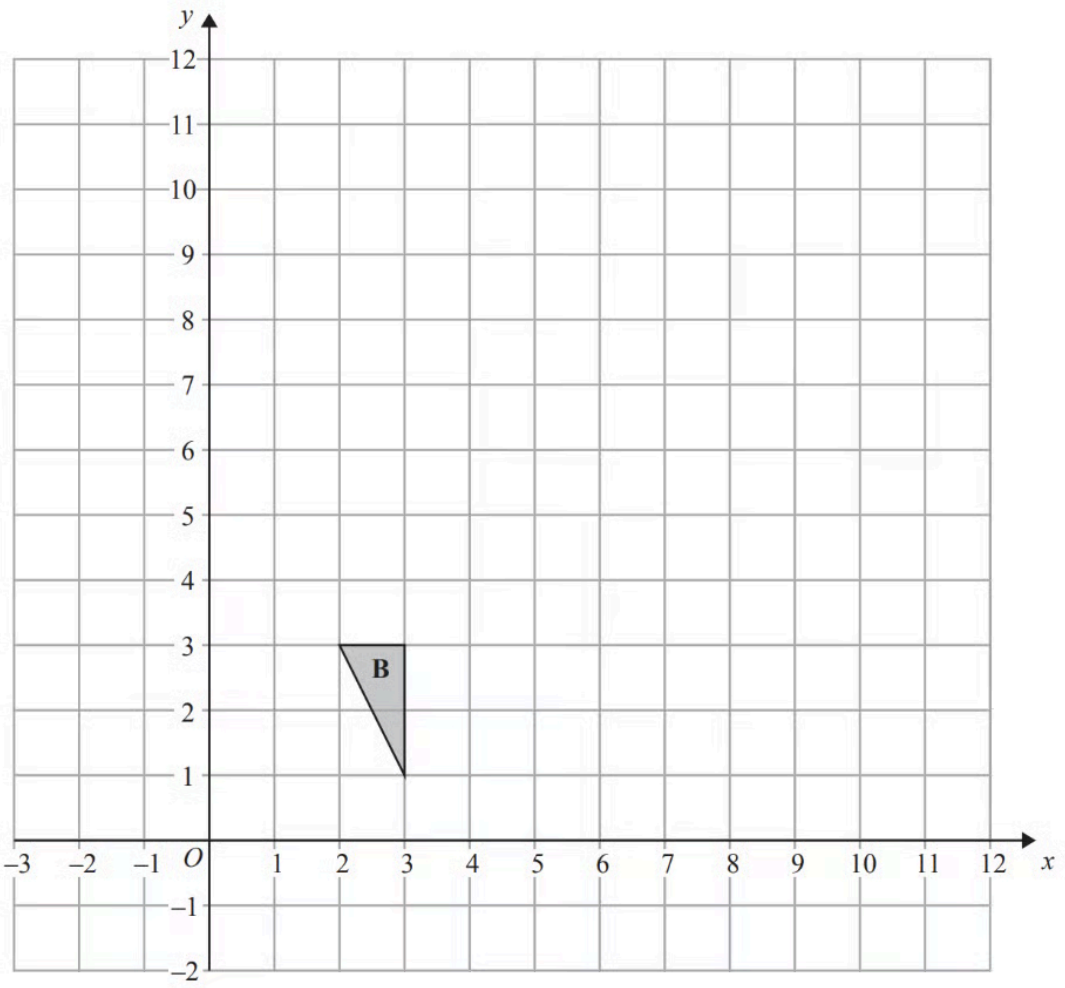
**9 (a)**




On the grid, rotate shape **A** $180°$ about the point (1, 1).

**(2 marks)**

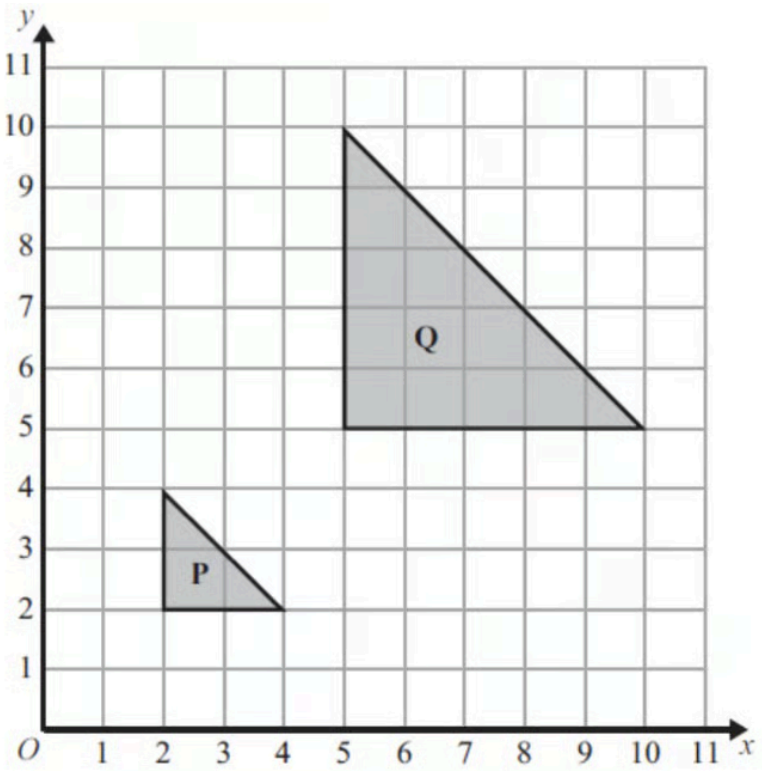
**(b)**




On the grid, enlarge triangle **B** by scale factor 3, centre (0, 0).

**(2 marks)**

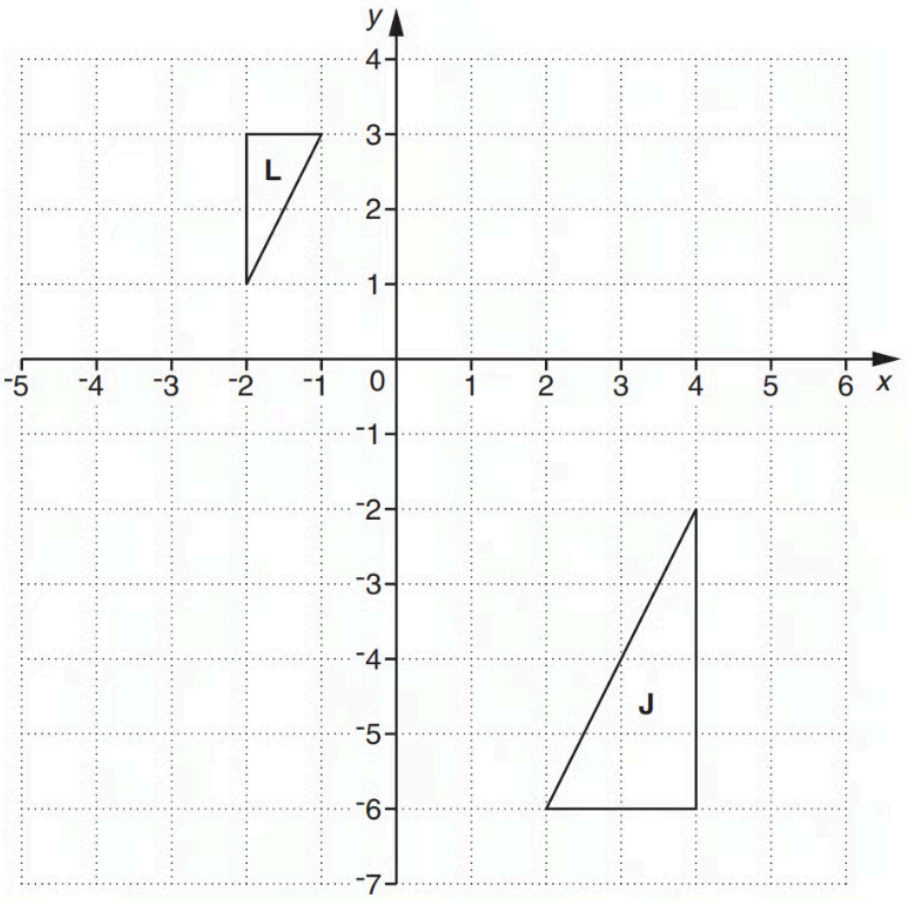
10




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

**(3 marks)**

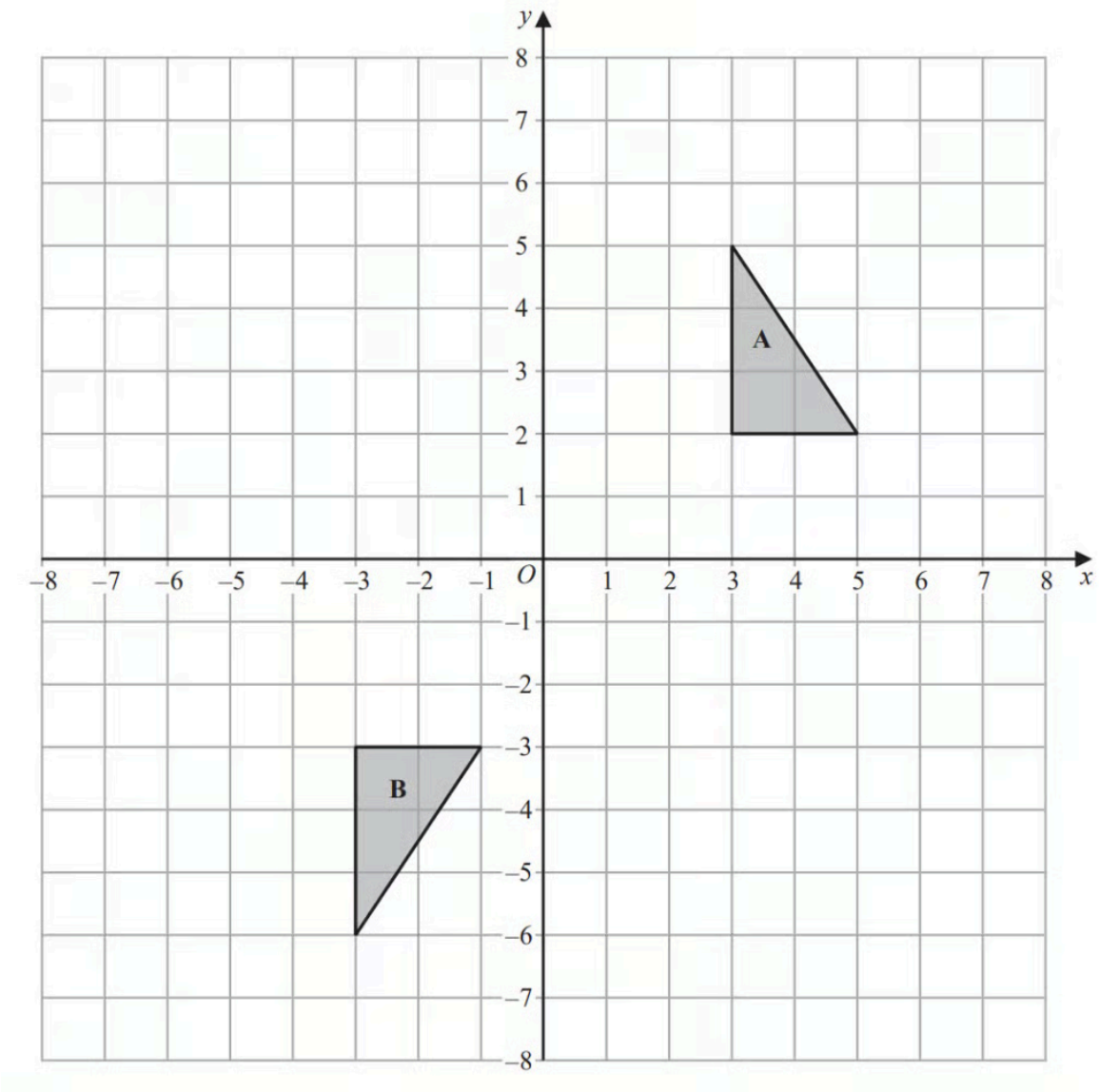
**11** Triangles **J** and **L** are drawn on the grid below.




What is the scale factor of the enlargement that maps triangle **L** onto triangle **J**?

**(1 mark)**

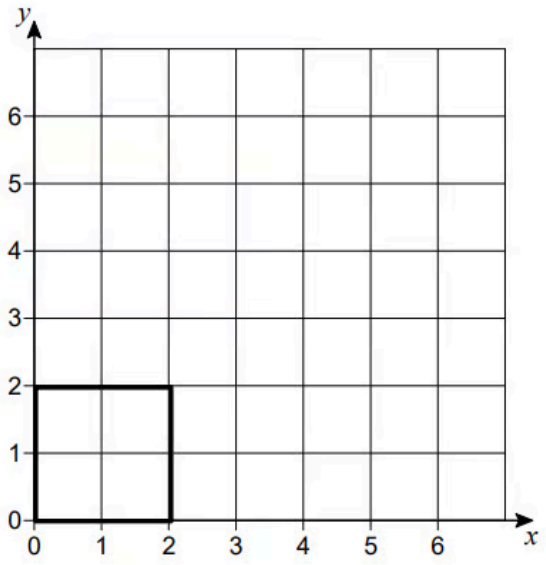
12




Shape **A** can be transformed to shape **B** by a reflection in the x-axis followed by a translation $\begin{pmatrix} c \\ d \end{pmatrix}$ Find the value of c and the value of $d$.

**(3 marks)**

**13**




$OABC$ is enlarged, scale factor 2, centre (0, 0)

Choose the number of invariant points on the perimeter of the square.

**A.** 0

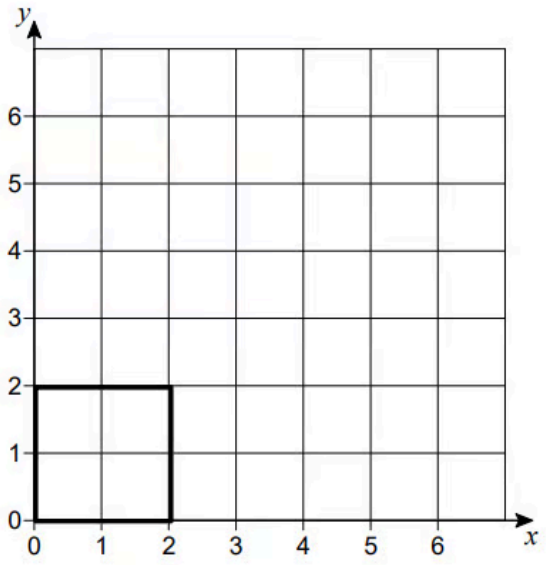
**B.** 1

**C.** 2

**D.** 4

**(1 mark)**

**14**




$OABC$ is reflected in the line $y = x$

Choose the number of invariant points on the perimeter of the square.

**A.** 0

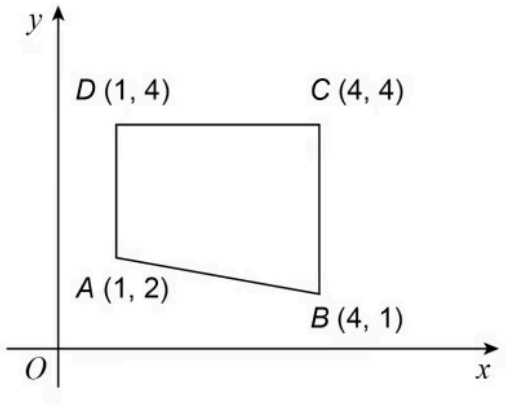
**B.** 1

**C.** 2

**D.** 4

**(1 mark)**

**15** $ABCD$ is a quadrilateral.




Not drawn accurately

The quadrilateral is reflected in the line $x = 4$

Which vertices are invariant?

**A.** $A$ and $D$

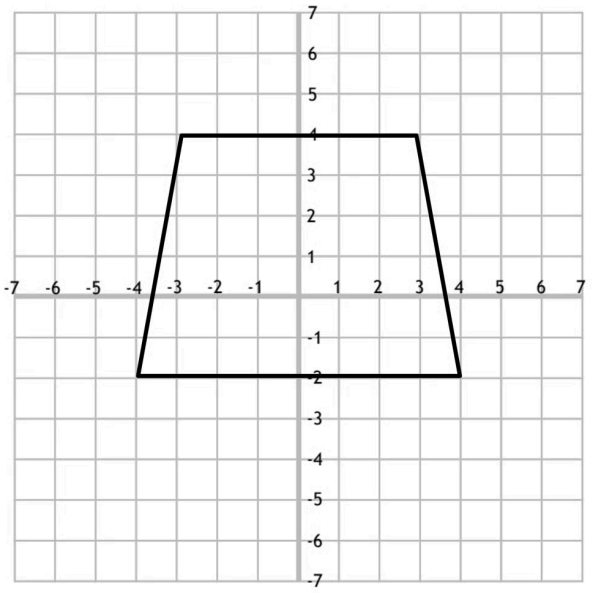
**B.** $C$ and $D$

**C.** $B$ and $C$

**D.** $B$ and $D$

**(1 mark)**

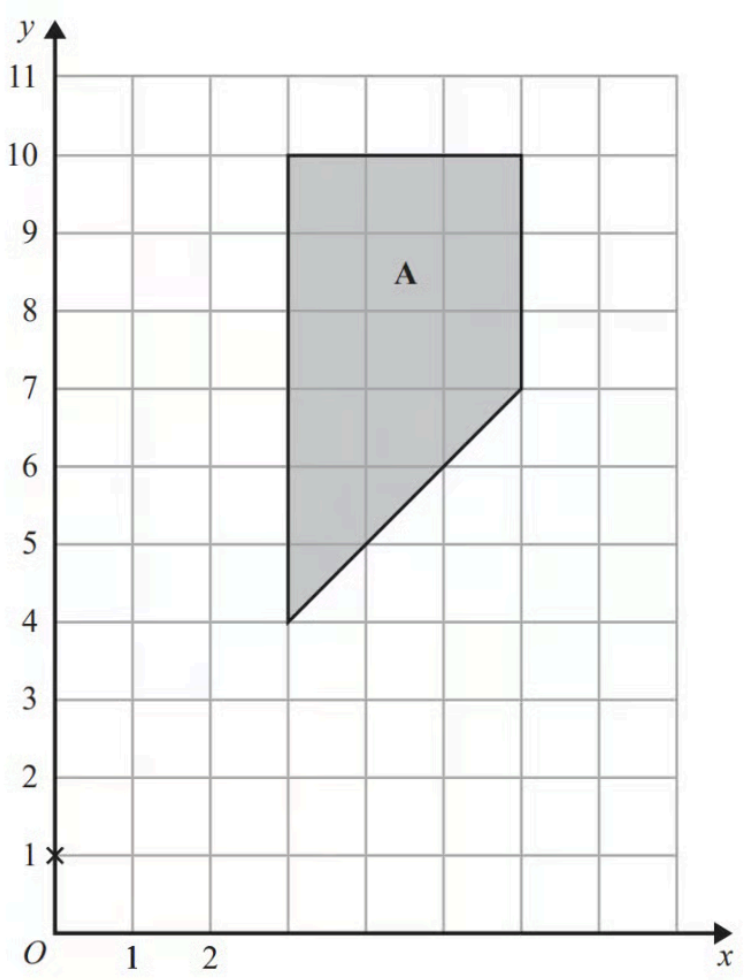
**16** Enlarge the trapezium by scale factor $-\frac{1}{2}$ using centre of enlargement $(2,0)$.




**(3 marks)**

# Hard Questions

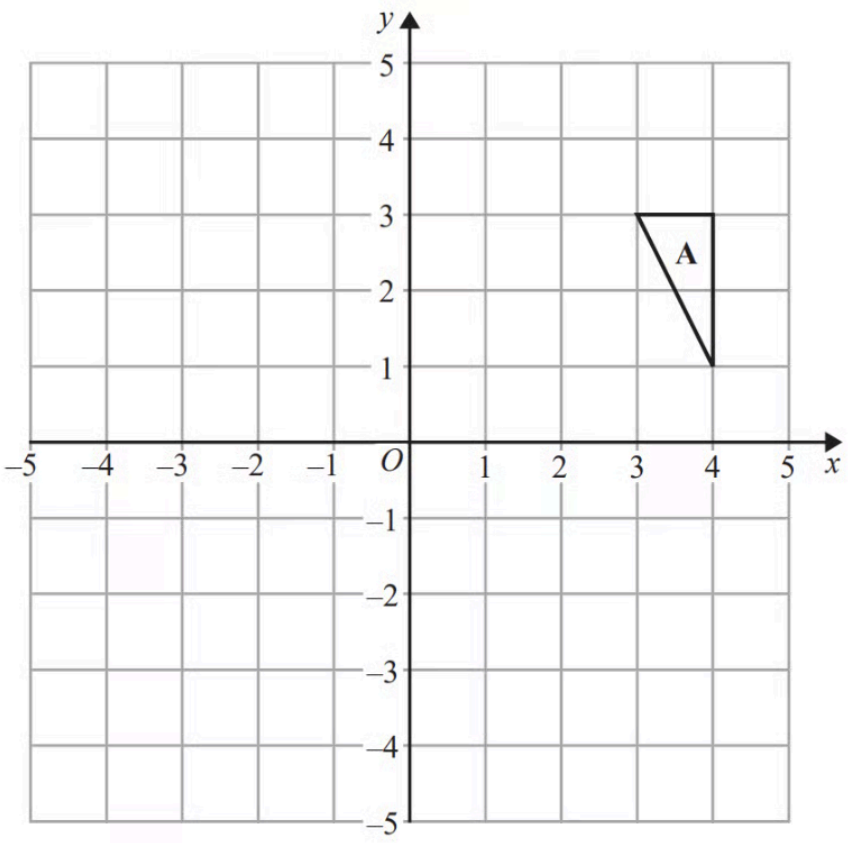
1




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

**(2 marks)**

**2** 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**.

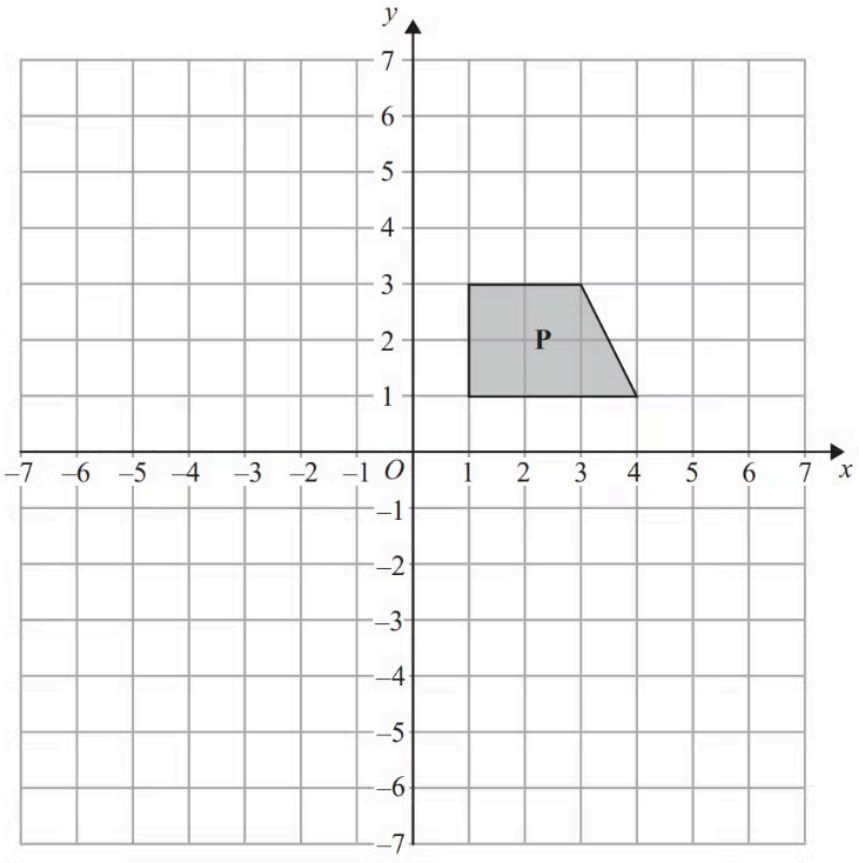
Amy reflects triangle **A** in the line $y = x$ to get triangle **D**. She is then going to reflect triangle **D** in the $x$-axis to get triangle **E**.

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.

**(3 marks)**

3



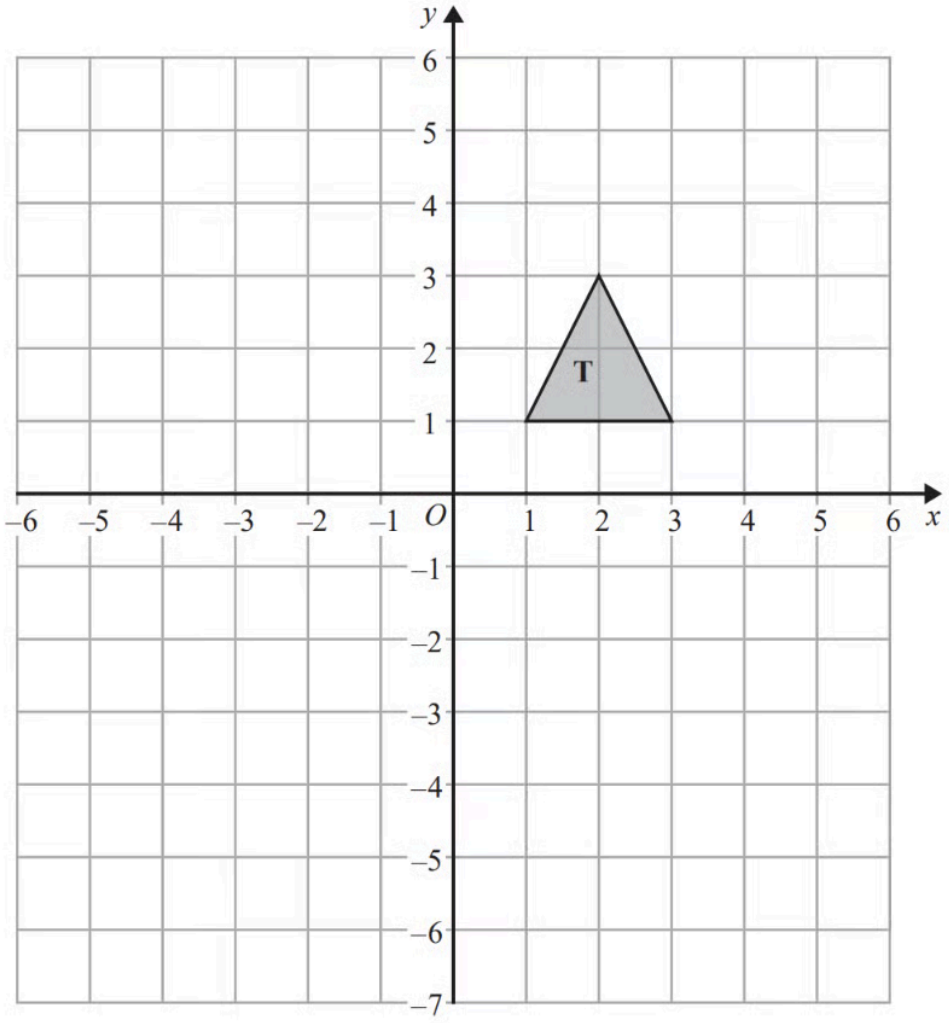

Shape **P** is reflected in the line $x = -1$ to give shape **Q**.

Shape **Q** is reflected in the line $y = 0$ to give shape **R**.

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

**(3 marks)**

4

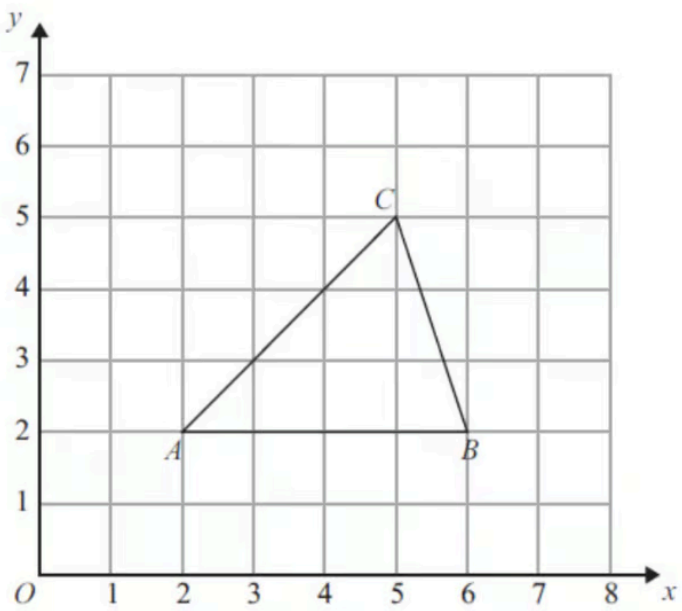



Shape **T** is reflected in the line $x = -1$ to give shape **R**. Shape **R** is reflected in the line $y = -2$ to give shape **S**.

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

**(2 marks)**

**5**



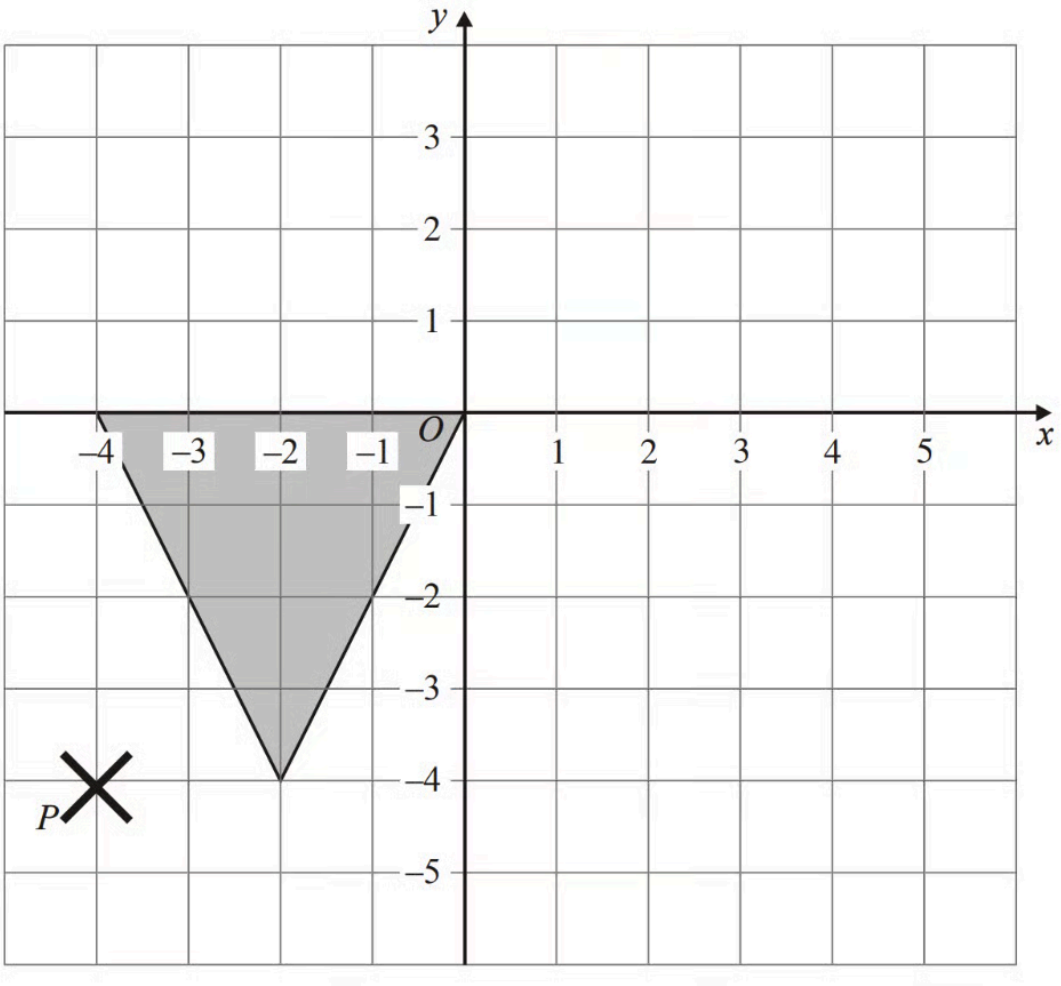

Triangle $ABC$ is drawn on a centimetre grid.
$A$ is the point (2, 2).
$B$ is the point (6, 2).
$C$ is the point (5, 5).

Triangle $PQR$ is an enlargement of triangle $ABC$ with scale factor $\frac{1}{2}$ and centre (0, 0).

Work out the area of triangle $PQR$.

**(3 marks)**

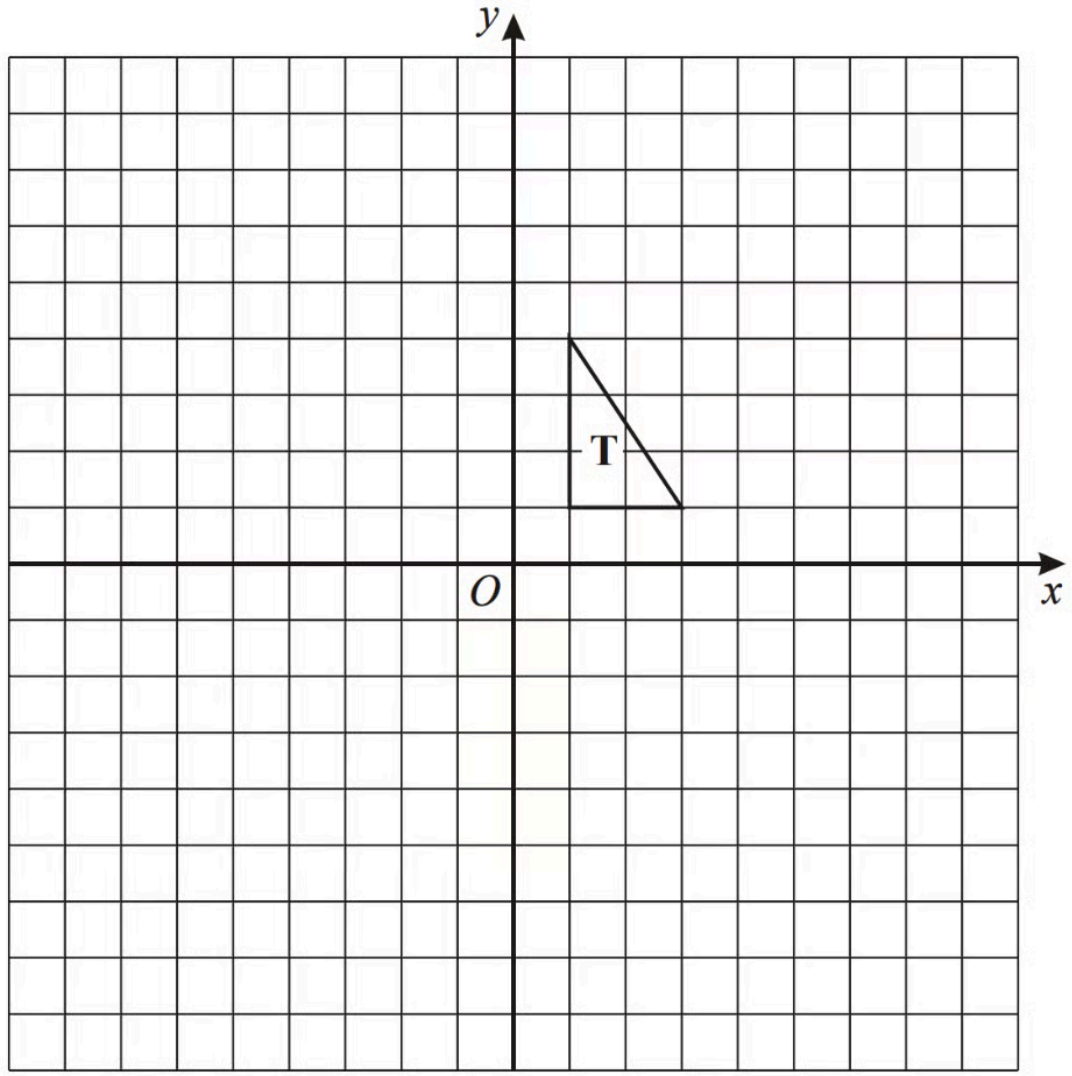
6




Enlarge the shaded triangle by a scale factor $1\frac{1}{2}$, centre $P$.

**(3 marks)**

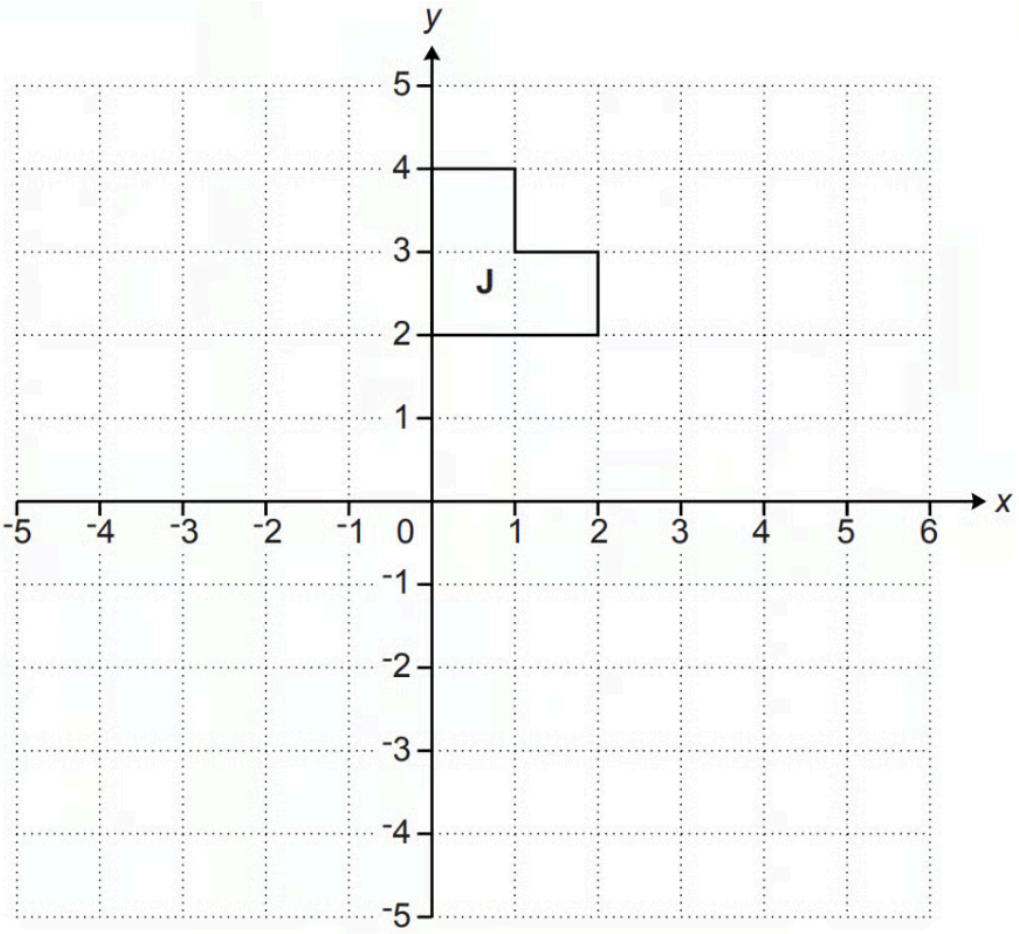
7




Enlarge triangle **T**, scale factor $-2$, centre $O$.

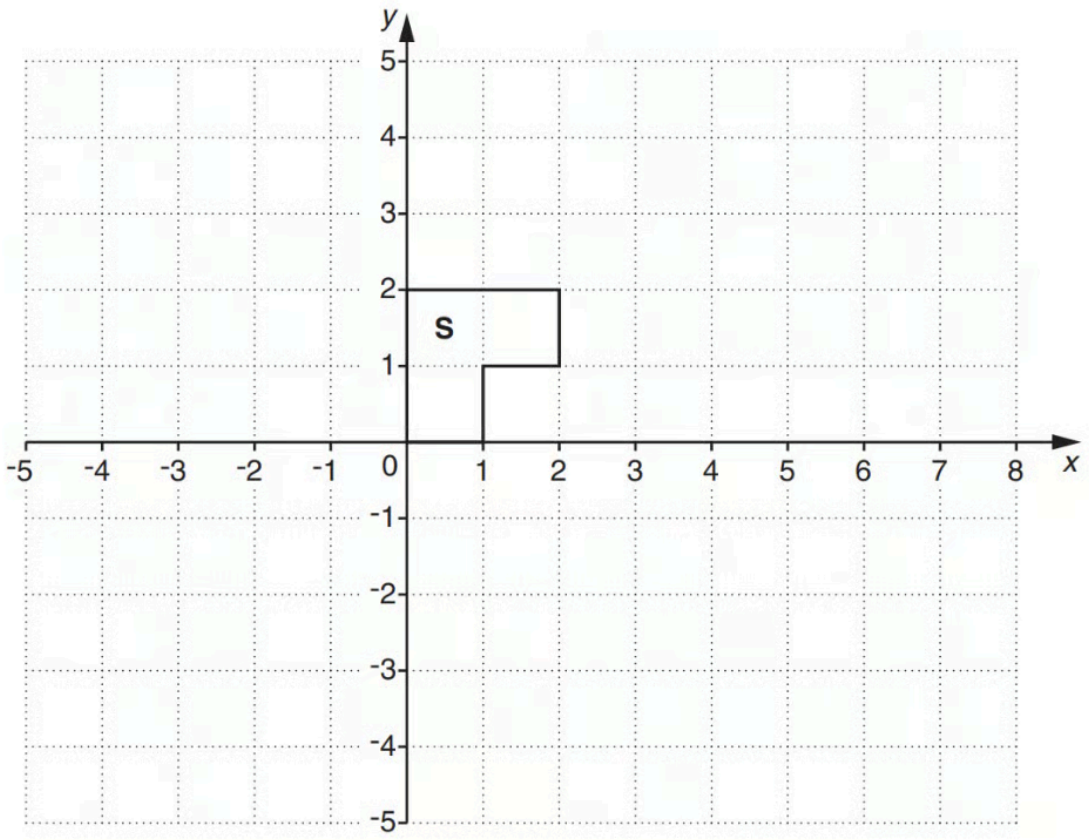
**(2 marks)**

**8** Enlarge shape **J** using scale factor -2 and centre (0, 2). Label your image **K.**




**(3 marks)**

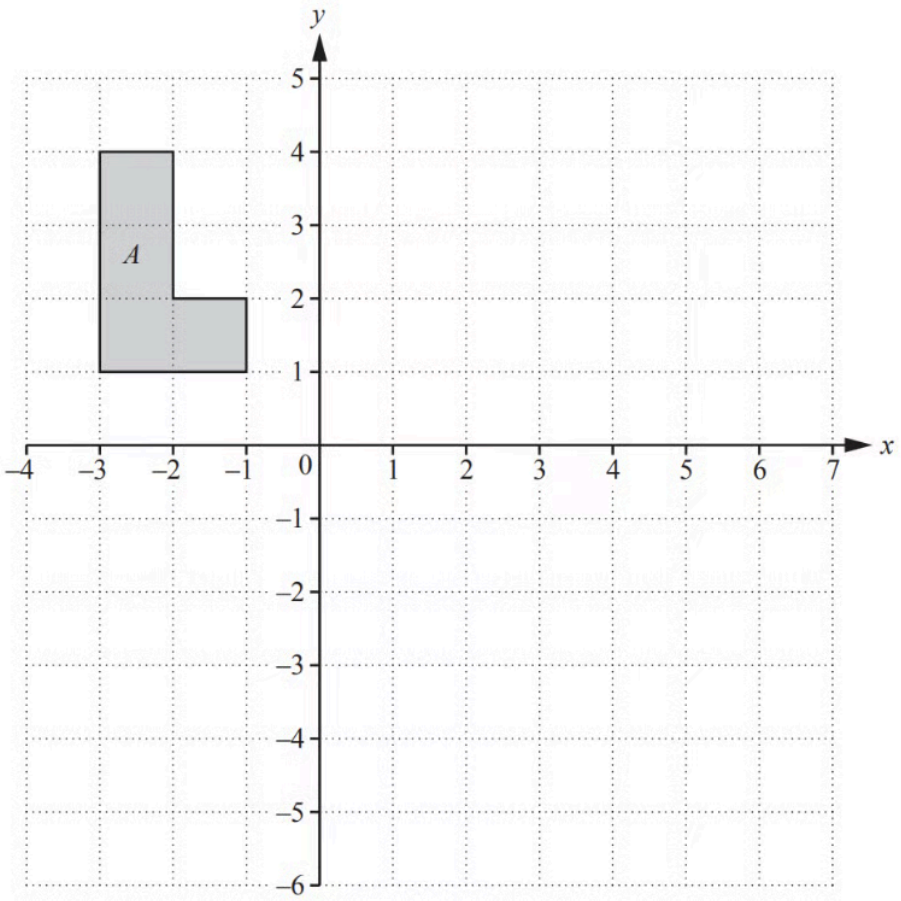
**9** Shape **S** is shown on the grid.




Enlarge shape **S** with scale factor −2 and centre (0, 0). Label your image **E**.

**(2 marks)**

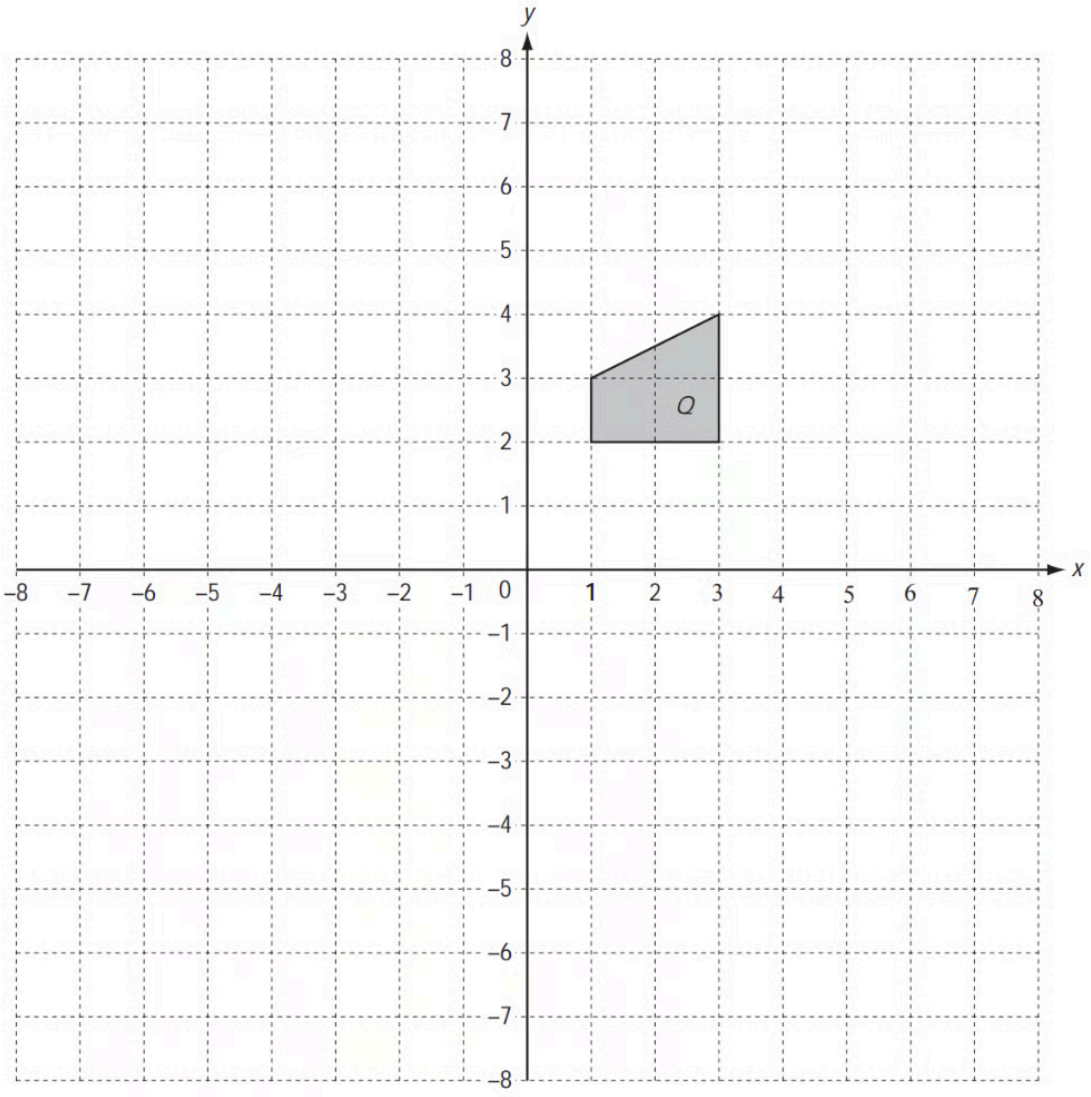
**10**




On the grid, draw the image of shape *A* after an enlargement with scale factor −2, centre (0, 1),

**(2 marks)**

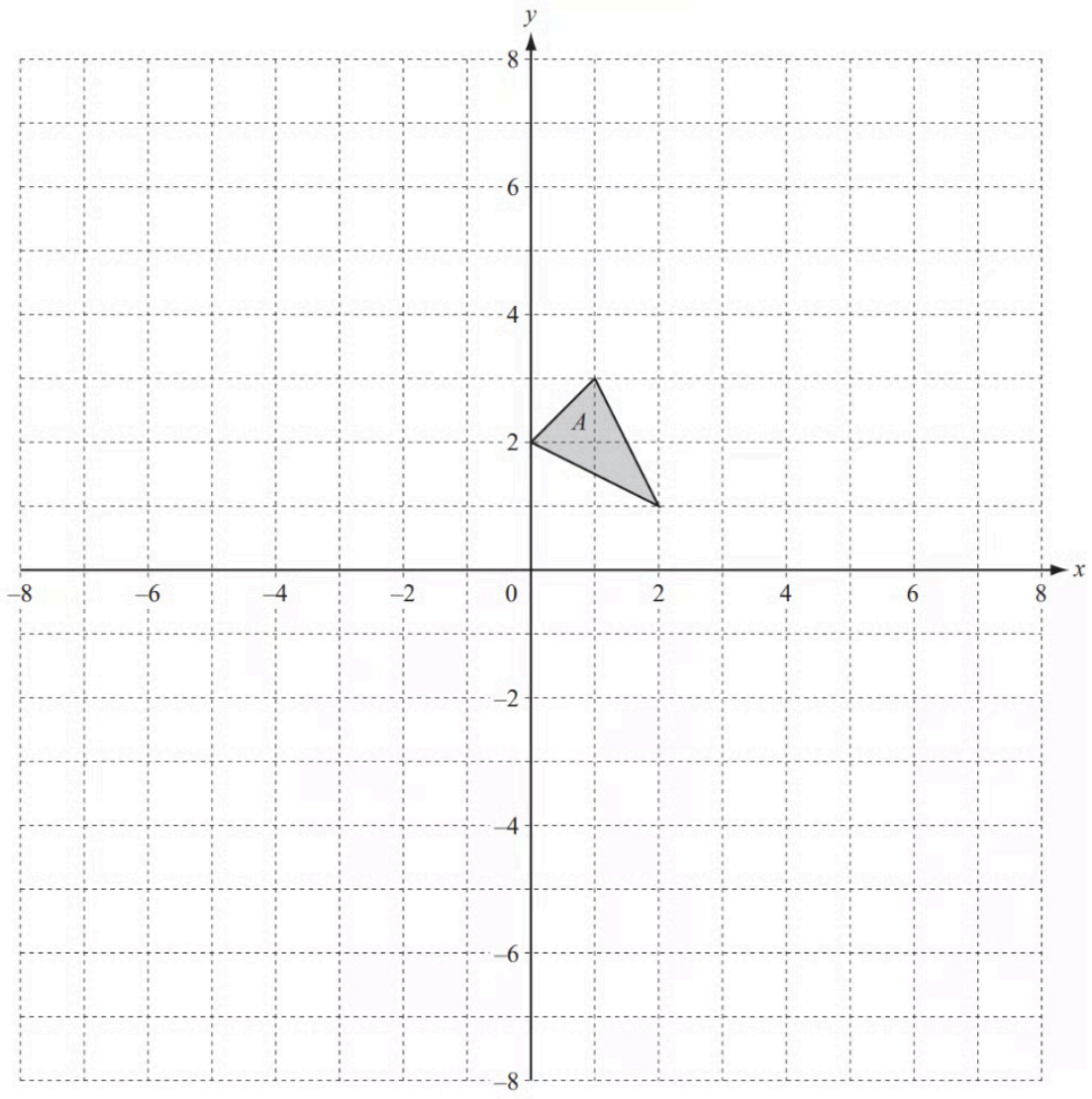
**11**




Draw the enlargement of shape Q, centre (0, 0), scale factor -2.

**(2 marks)**

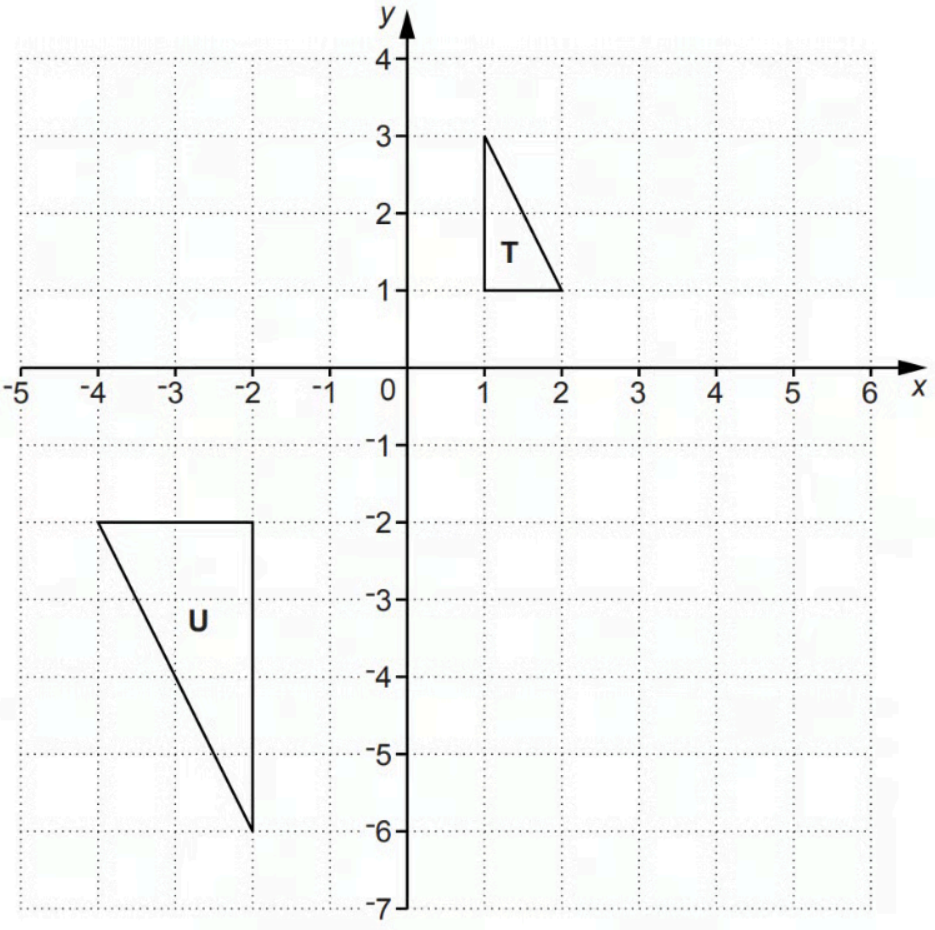
12




On the grid above, draw the enlargement of triangle A by scale factor -4, with centre (0, 1). Label the image E.

**(2 marks)**

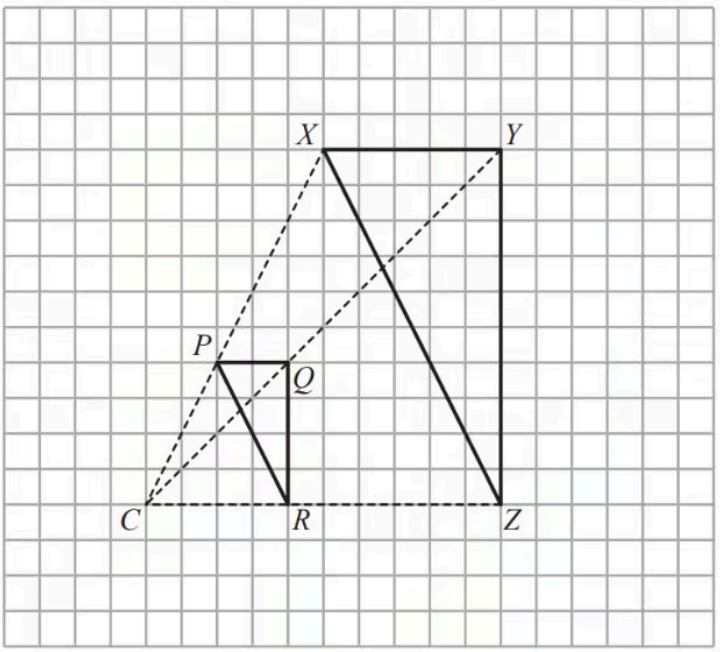
13




Describe fully the enlargement that maps triangle **T** onto triangle **U**.

**(2 marks)**

**14**



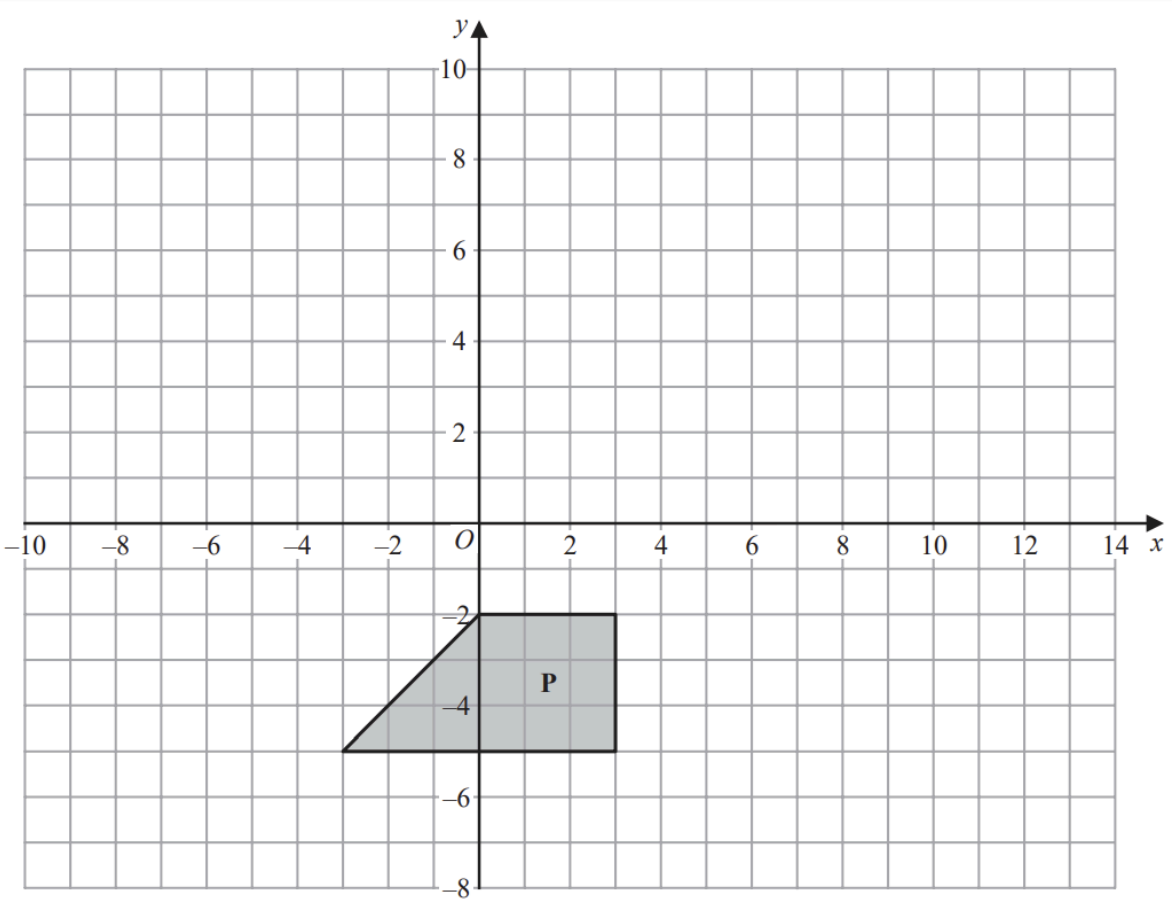

Roy is going to enlarge triangle $PQR$ with centre $C$ and scale factor $1\frac{1}{2}$

He draws triangle $XYZ$.

Explain why Roy's diagram is **not** correct.

**(1 mark)**

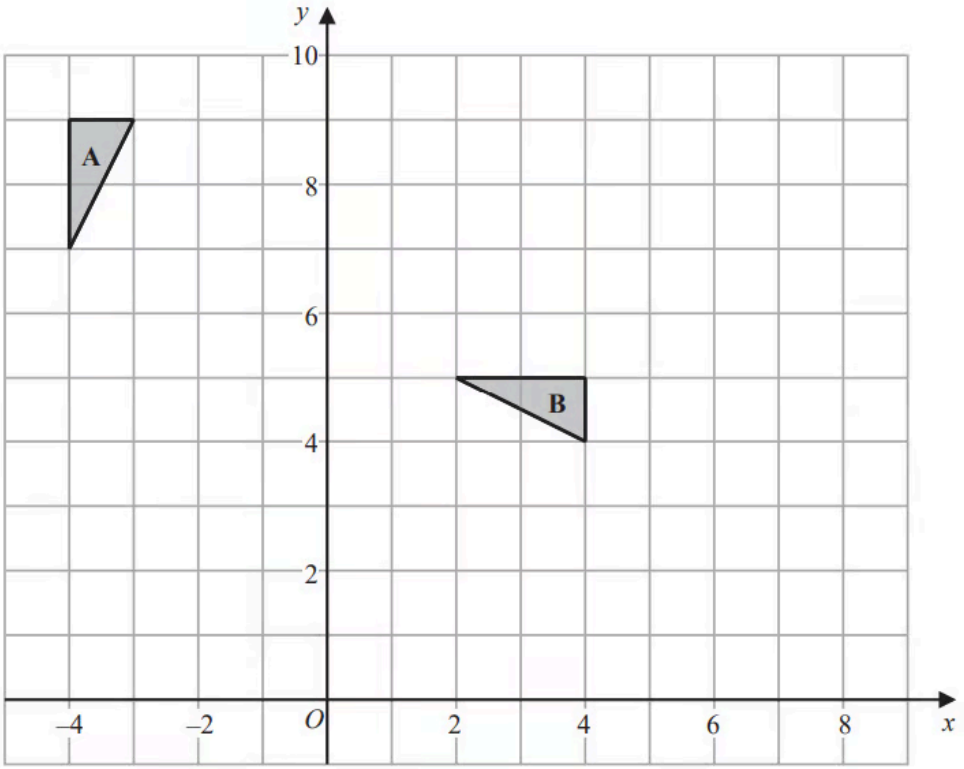
**15** Here is a shape **P** drawn on a grid of squares.




On the grid, rotate shape **P** 180° about the point (–3, 2) Label the new shape **Q**.

**(2 marks)**

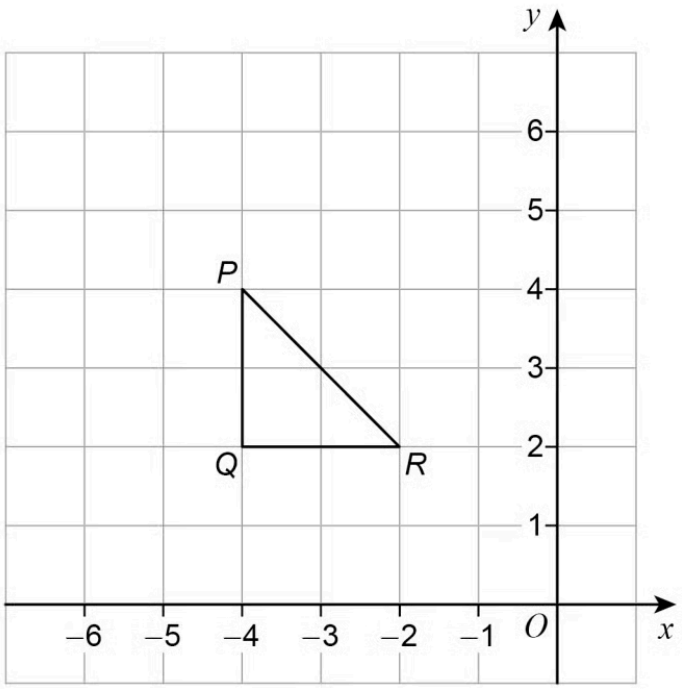
16




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

**(3 marks)**

**17** Triangle $PQR$ is shown.




When $PQR$ is reflected in a line, $P$ **and** $R$ are invariant points. Choose the equation of the line.

**A.** $y = x + 6$

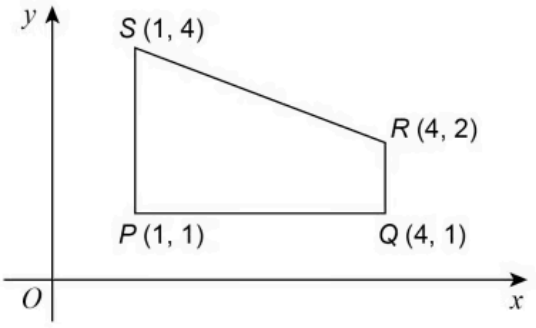
**B.** $y = -x$

**C.** $y = 2$

**D.** $x = -4$

**(1 mark)**

**18** A sketch of a quadrilateral $PQRS$ is shown.




Not drawn accurately

$PQRS$ is reflected in the line $y = x$

Choose the vertex that is invariant.

**A.** *P*

**B.** *Q*

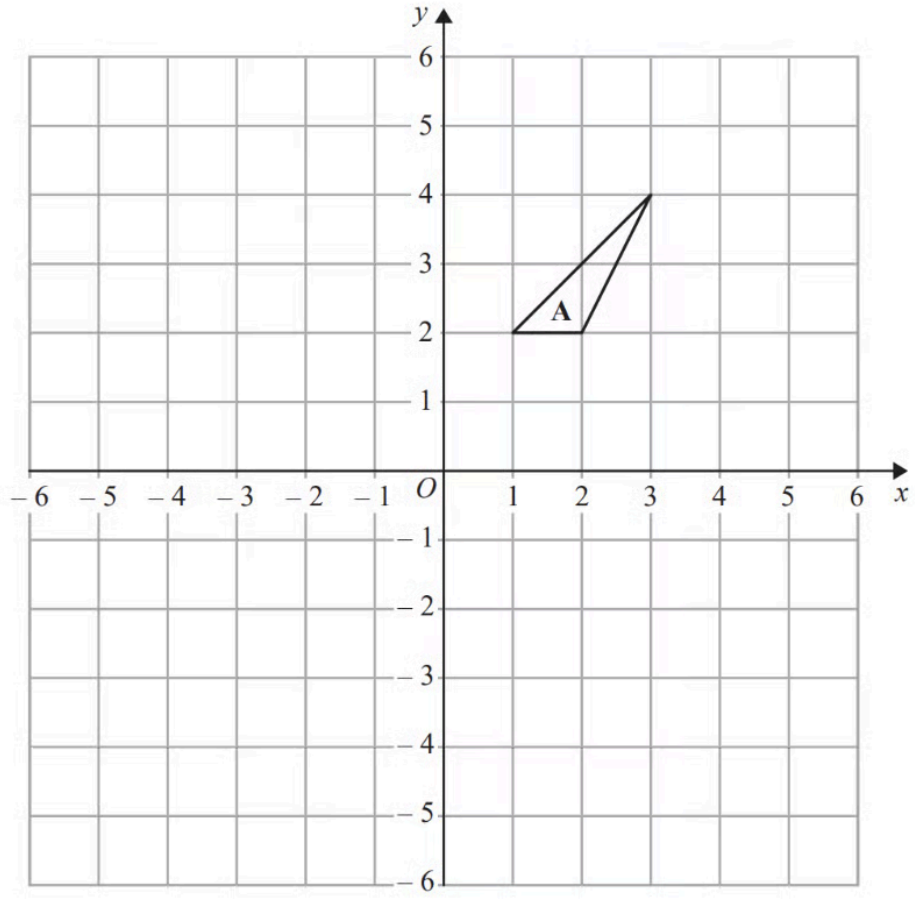
**C.** *R*

**D.** *S*

**(1 mark)**

# Very Hard Questions

**1**



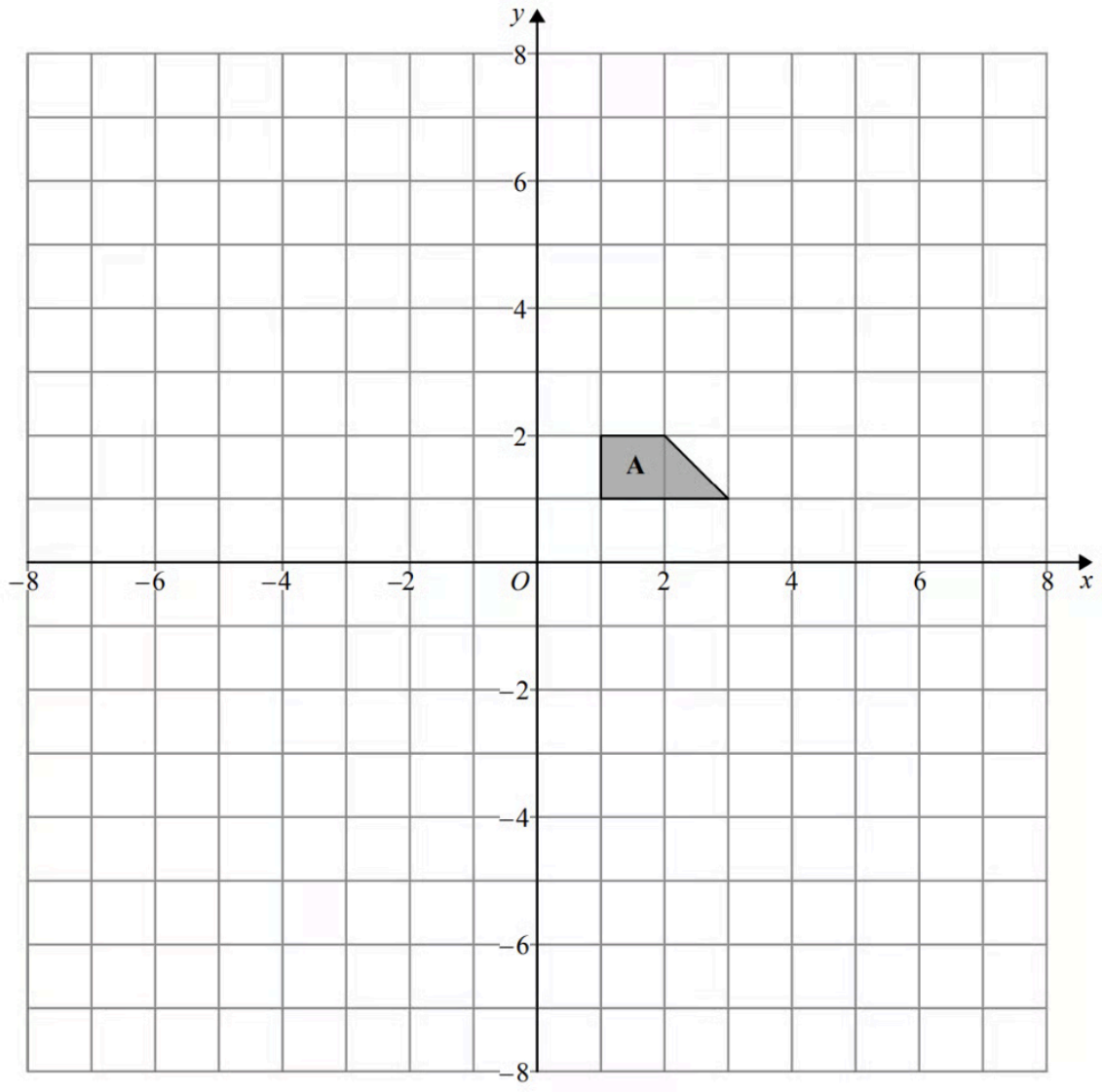

Triangle **A** is rotated $90°$ clockwise about the point (0, 1) to give triangle **B**.

Triangle **B** is translated by the vector $\begin{pmatrix} -3 \\ -1 \end{pmatrix}$ to give triangle **C**.

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

**(3 marks)**

**2 (a)**



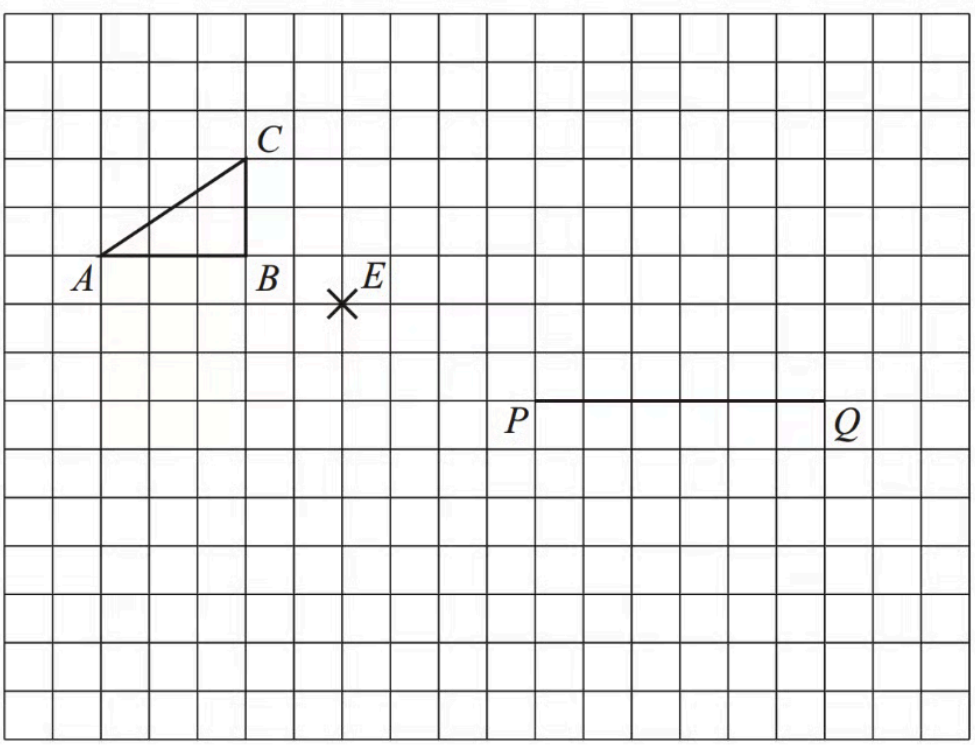

Enlarge shape **A** by scale factor −2, centre (0, 0) Label your image **B**.

**(2 marks)**

**(b)** Describe fully the single transformation that will map shape **B** onto shape **A**.

**(1 mark)**

**3 (a)** The triangle $ABC$ is to be enlarged, using $E$ as the centre, to give the triangle $PQR$. The line $PQ$ is the image of the line $BA$.

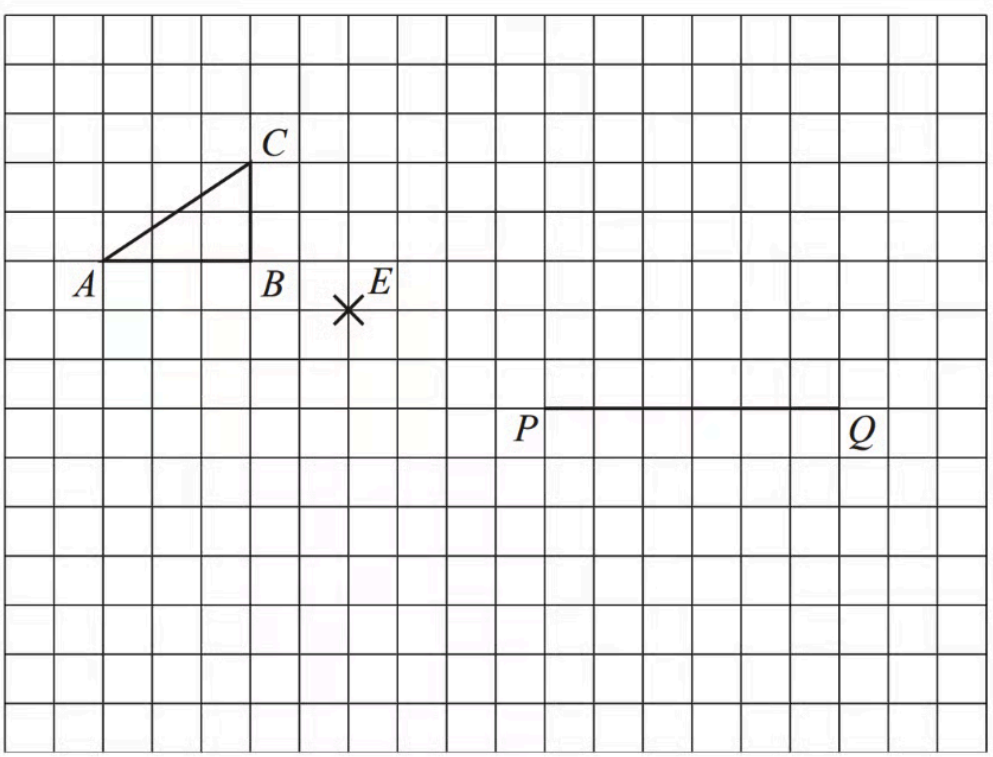



Write down the scale factor of the enlargement.

**(1 mark)**

**(b)** The triangle $ABC$ is to be enlarged, using $E$ as the centre, to give the triangle $PQR$. The

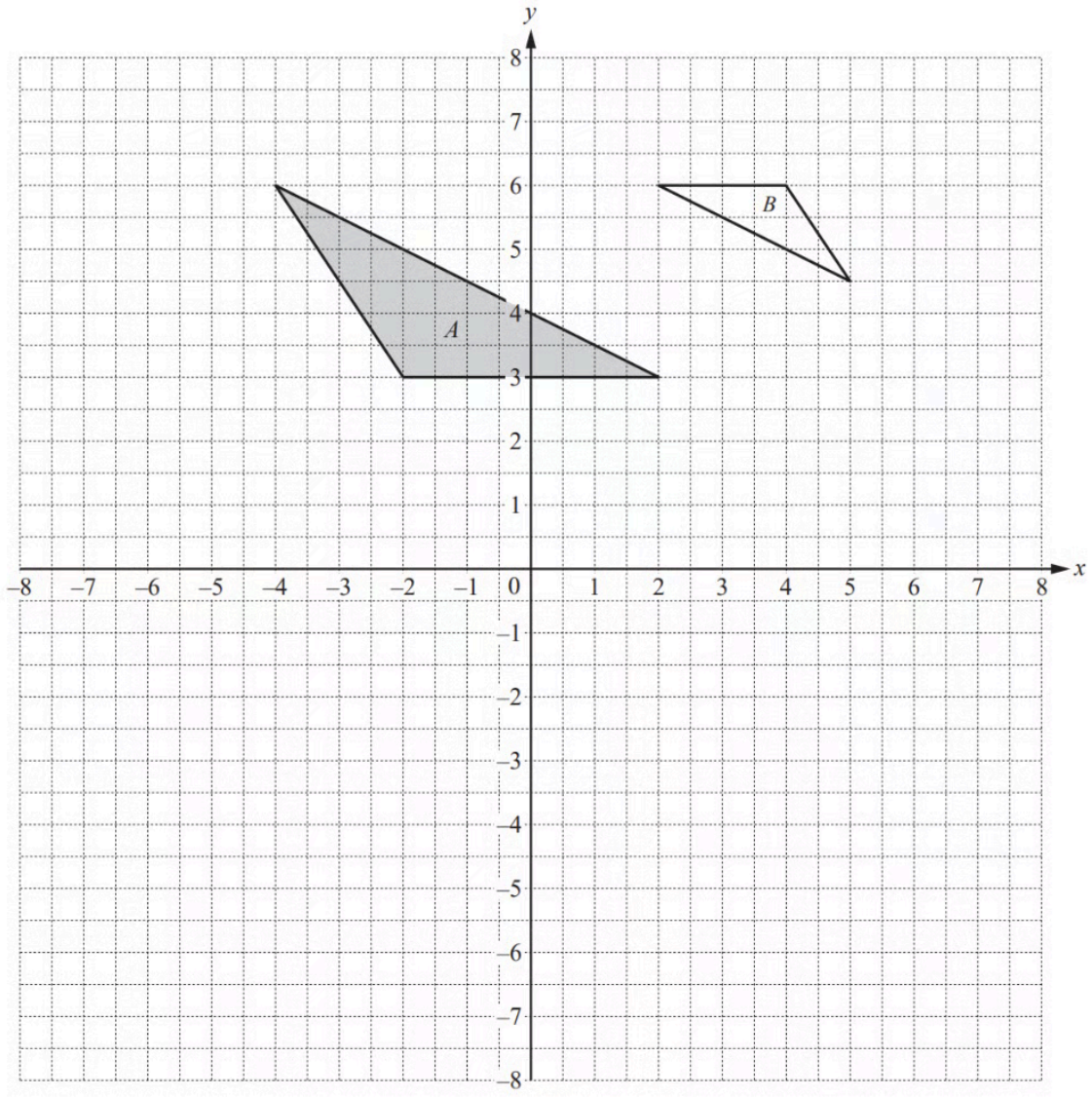
line $PQ$ is the image of the line $BA$.




Complete the triangle $PQR$.

**(1 mark)**

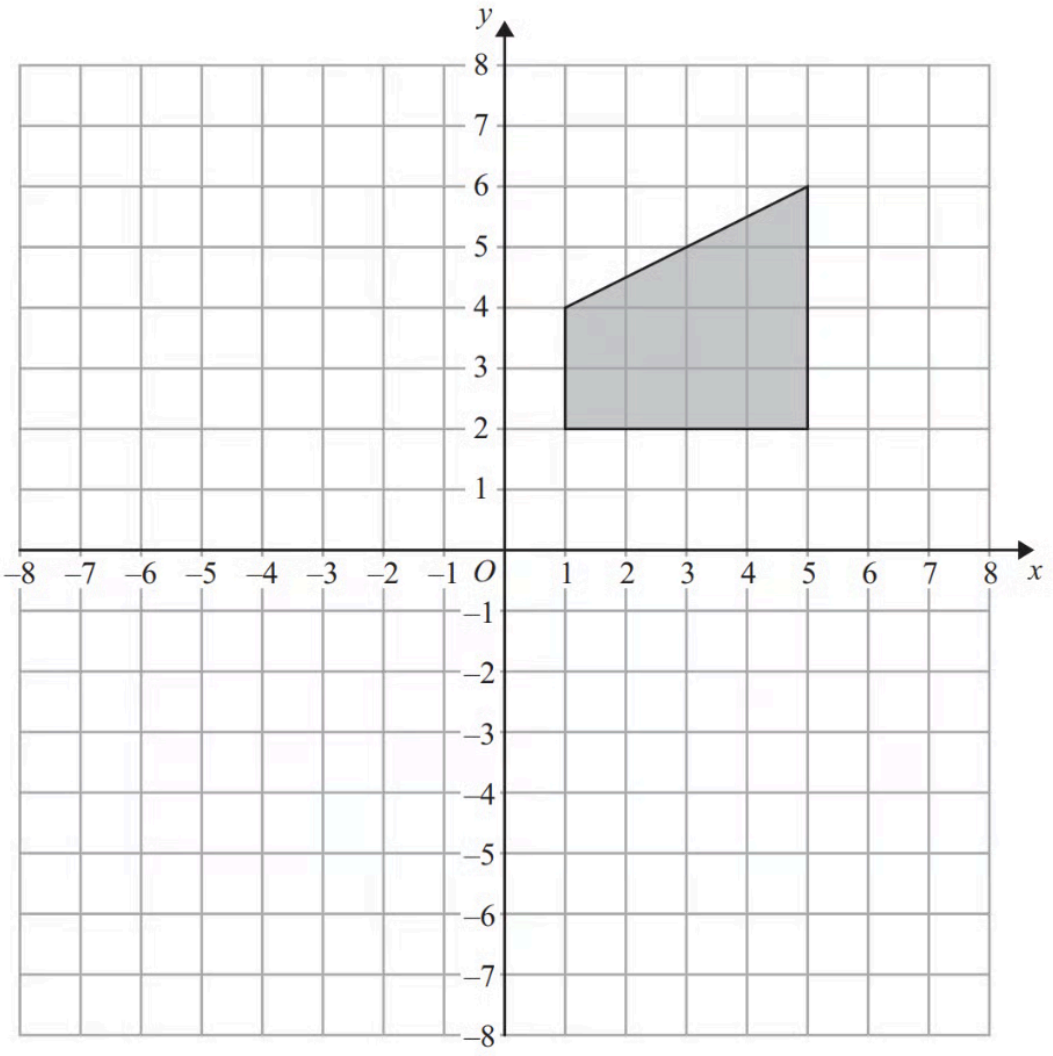
**4**




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

**(3 marks)**

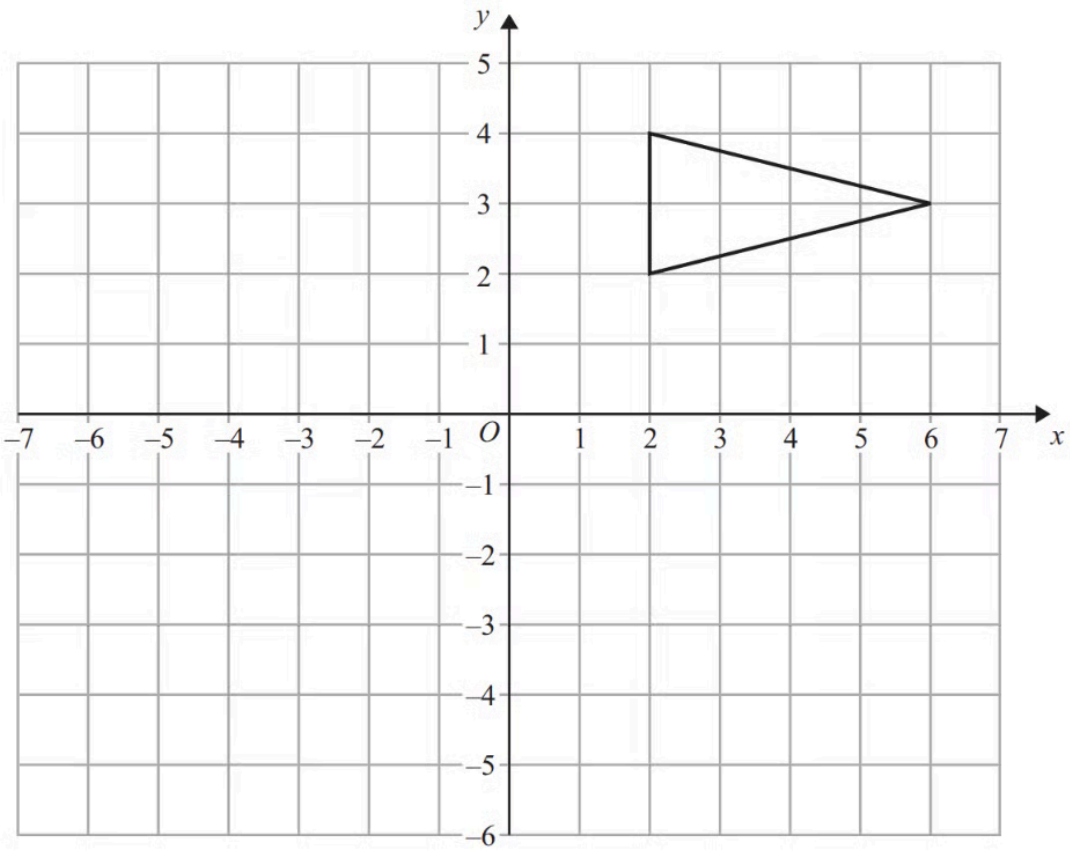
5




Enlarge the shaded shape by scale factor $-\frac{1}{2}$ with centre (−1, −2).

**(3 marks)**

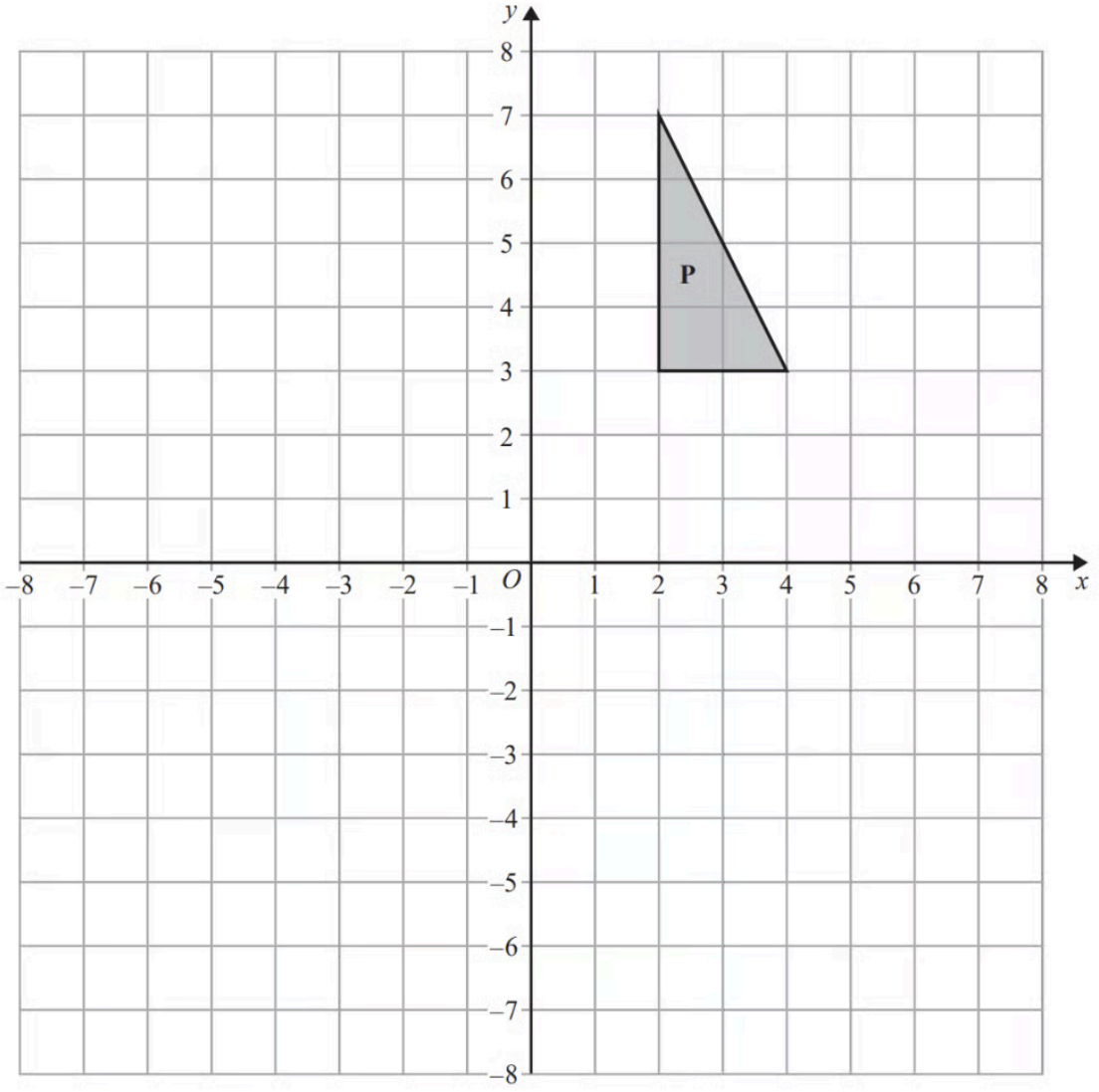
6




On the grid, enlarge the triangle by scale factor $-\frac{1}{2}$, centre (0, −2).

**(2 marks)**

7

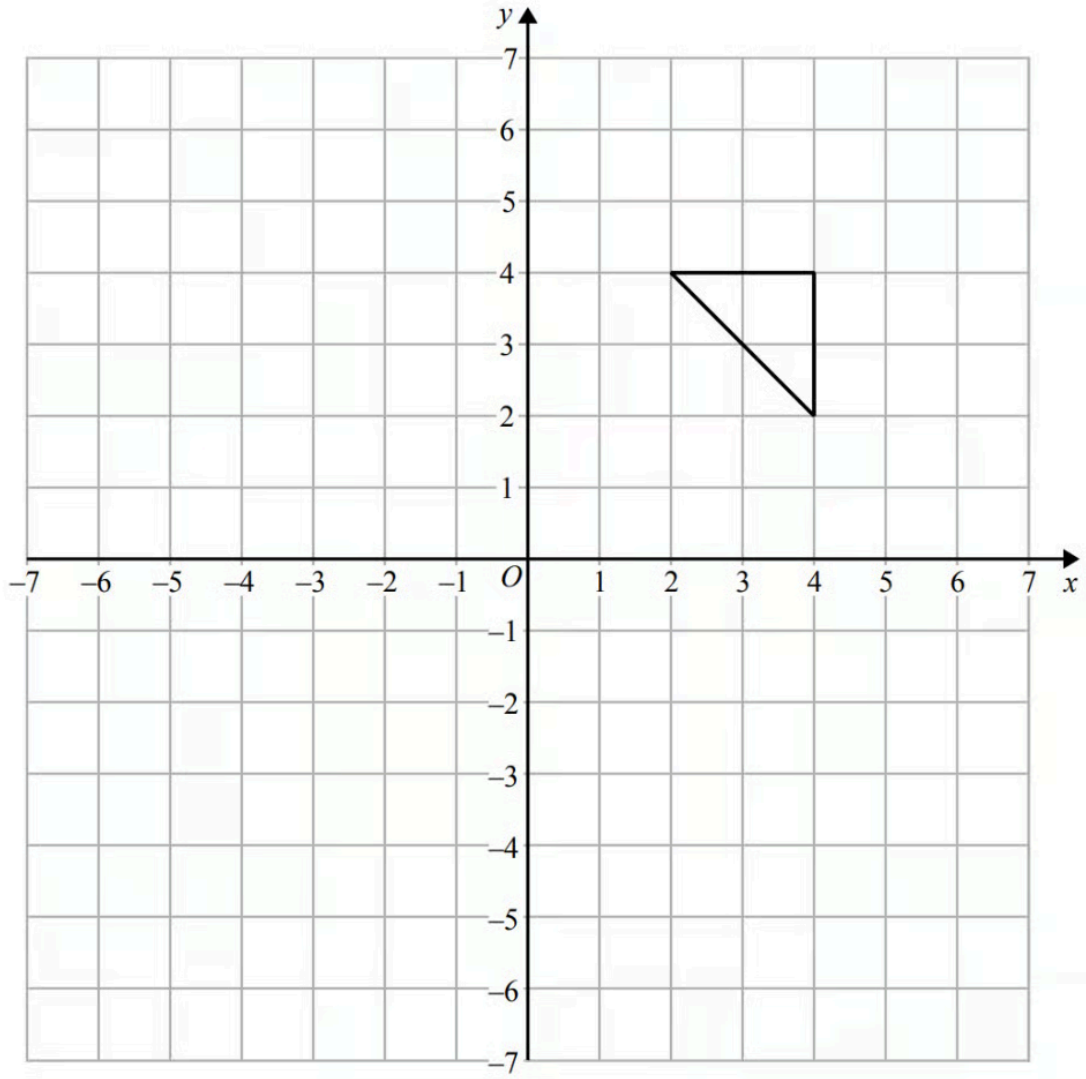



Enlarge shape **P** by scale factor $-\frac{1}{2}$ with centre of enlargement (0, 0).

Label your image **Q**.

**(2 marks)**

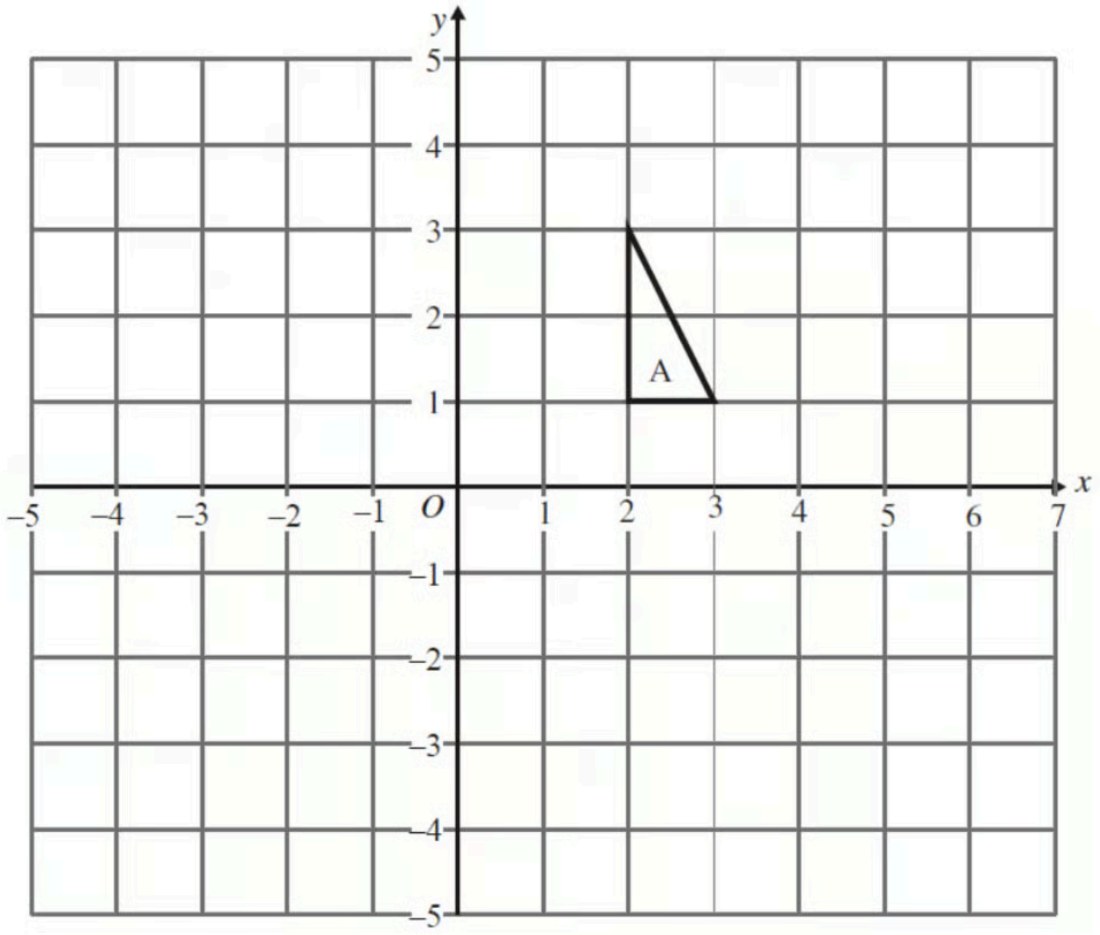
8




On the grid, enlarge the triangle by scale factor $-1\frac{1}{2}$ , centre (0, 2).

**(2 marks)**

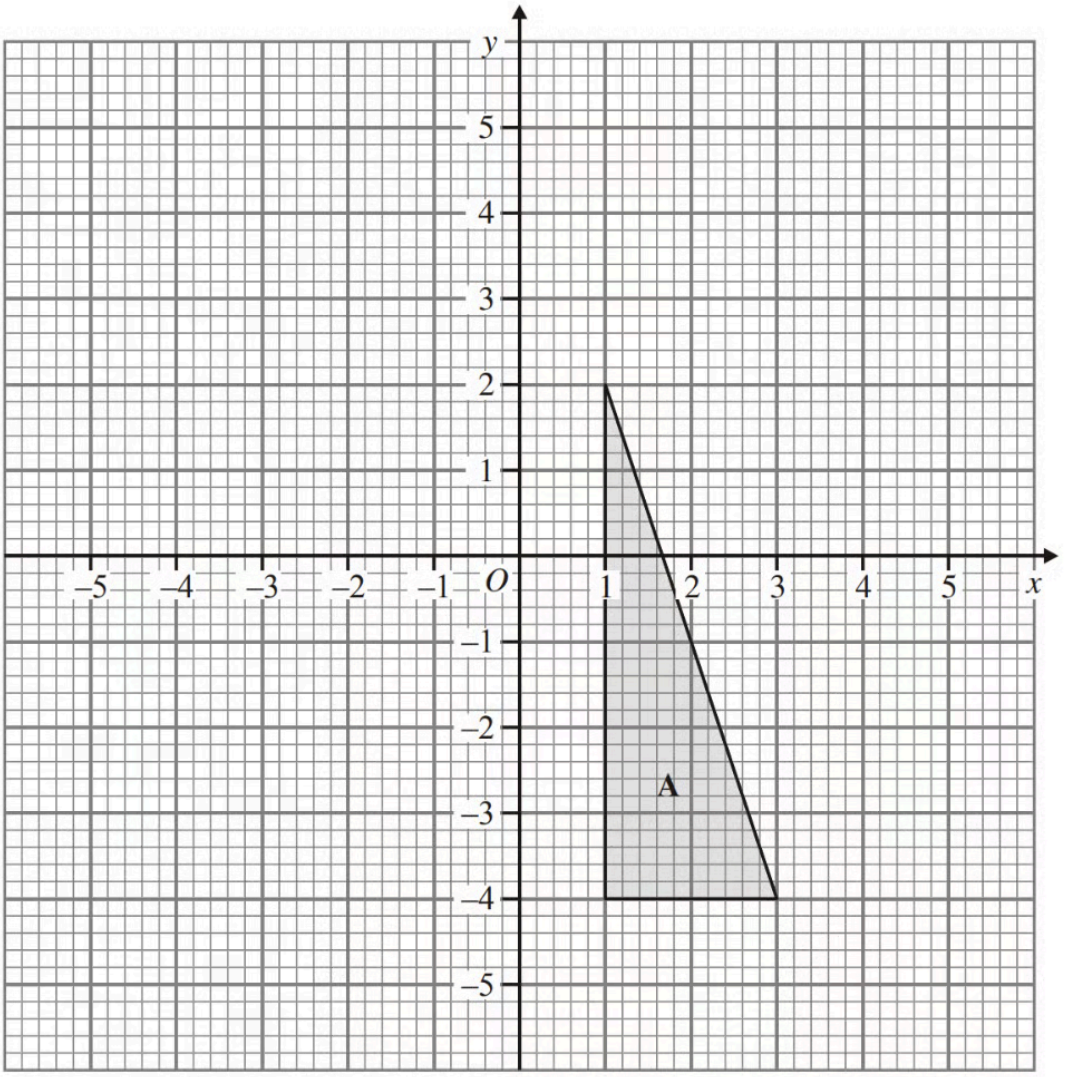
9




Enlarge triangle **A** by scale factor $-1\frac{1}{2}$, centre $O$.

**(3 marks)**

10

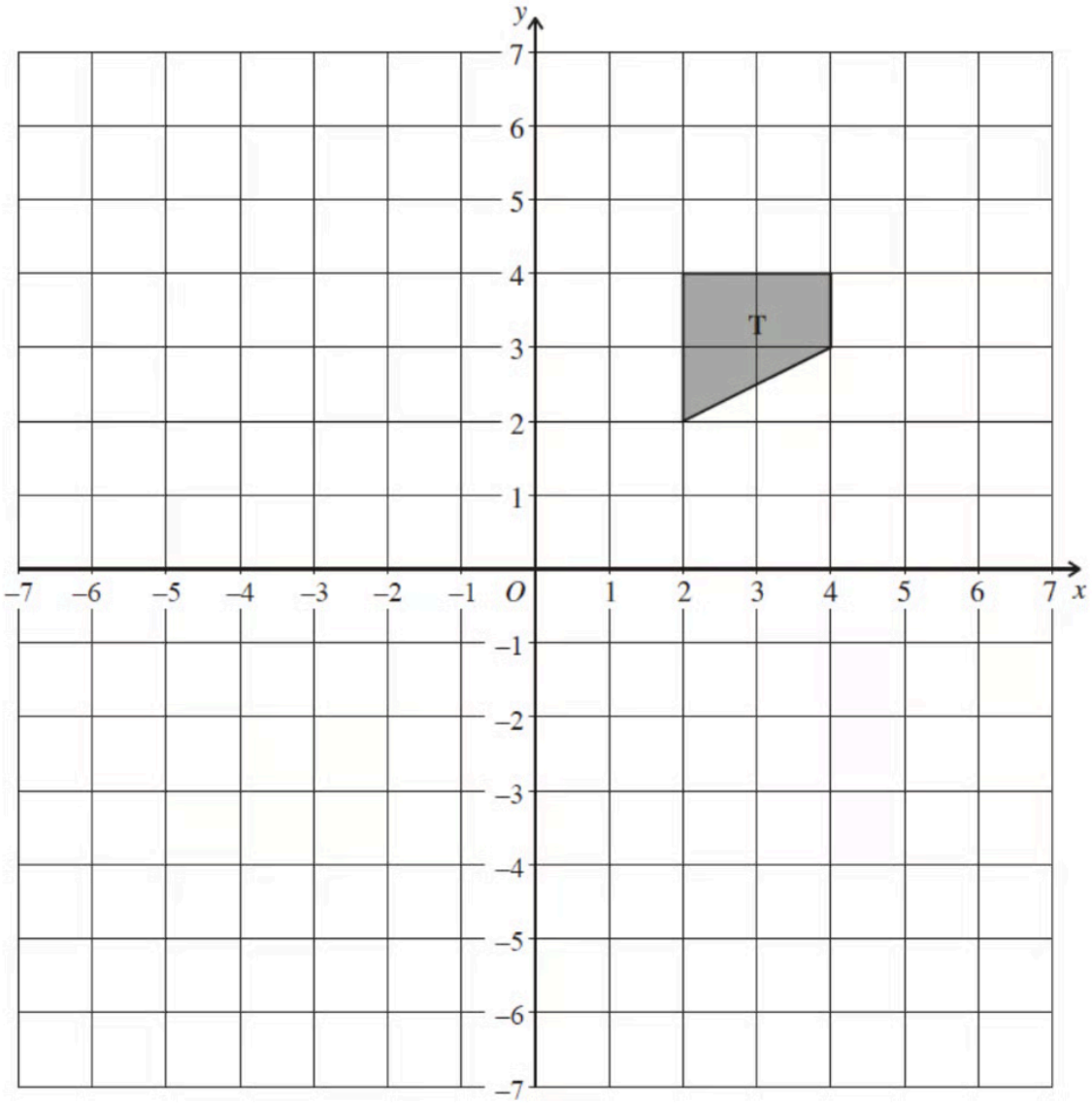



Enlarge triangle **A** by scale factor $-\frac{1}{2}$, centre (−1, −2).

Label your triangle **B**.

**(3 marks)**

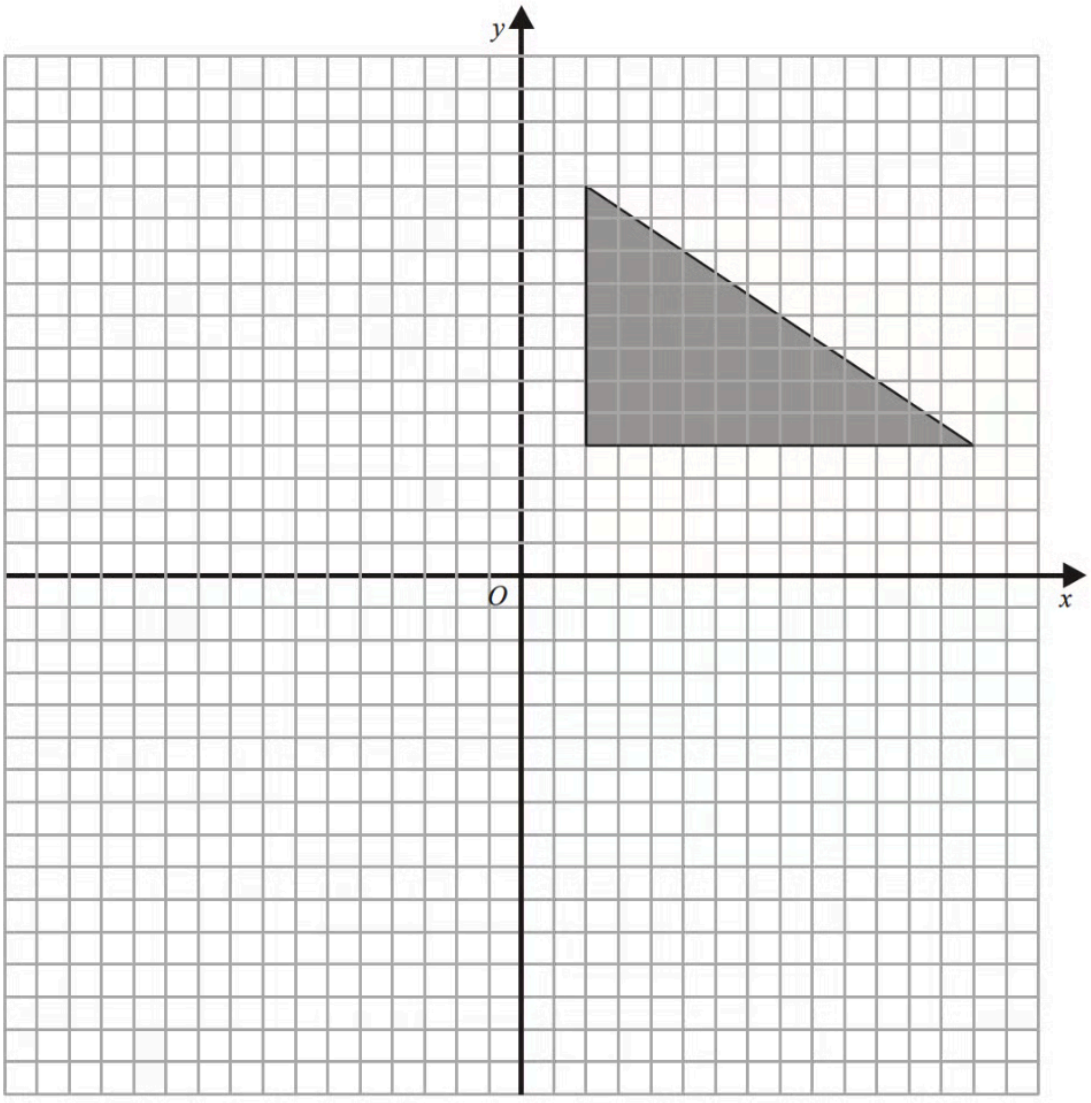
**11**




Enlarge shape **T** with scale factor −1.5, centre (0, 2).

**(3 marks)**

12




Enlarge the triangle by a scale factor of $-\frac{1}{2}$, centre $O$.

**(2 marks)**