Chhetri Academy

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GCSE MATHS

Geometry and measures

Edexcel 1MA1 | Subtopic collection Topic 48

Transformations

Higher tier

Past paper question booklet

80	2003-2025	Higher
question groups	available papers	tier

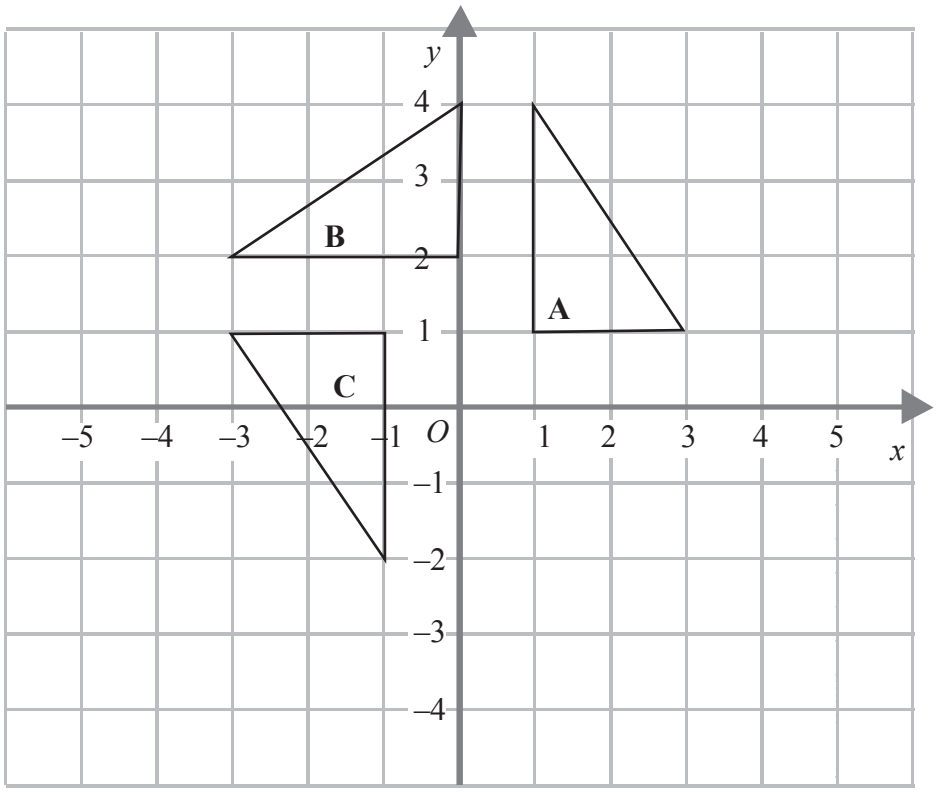
Before you begin

1. Show working and use units where appropriate.
2. Use extra paper if you need more space.
3. Print at actual size (100%) for measurement questions.

Name _____ **Date** _____

Whole questions are retained for context; some parts cover other points. Legacy sources are labelled.

6.



Shape **A** is rotated 90° anticlockwise, centre (0,1), to shape **B**.

Shape **B** is rotated 90° anticlockwise, centre (0,1), to shape **C**.

Shape **C** is rotated 90° anticlockwise, centre (0,1), to shape **D**.

(a) Mark the position of Shape **D**.

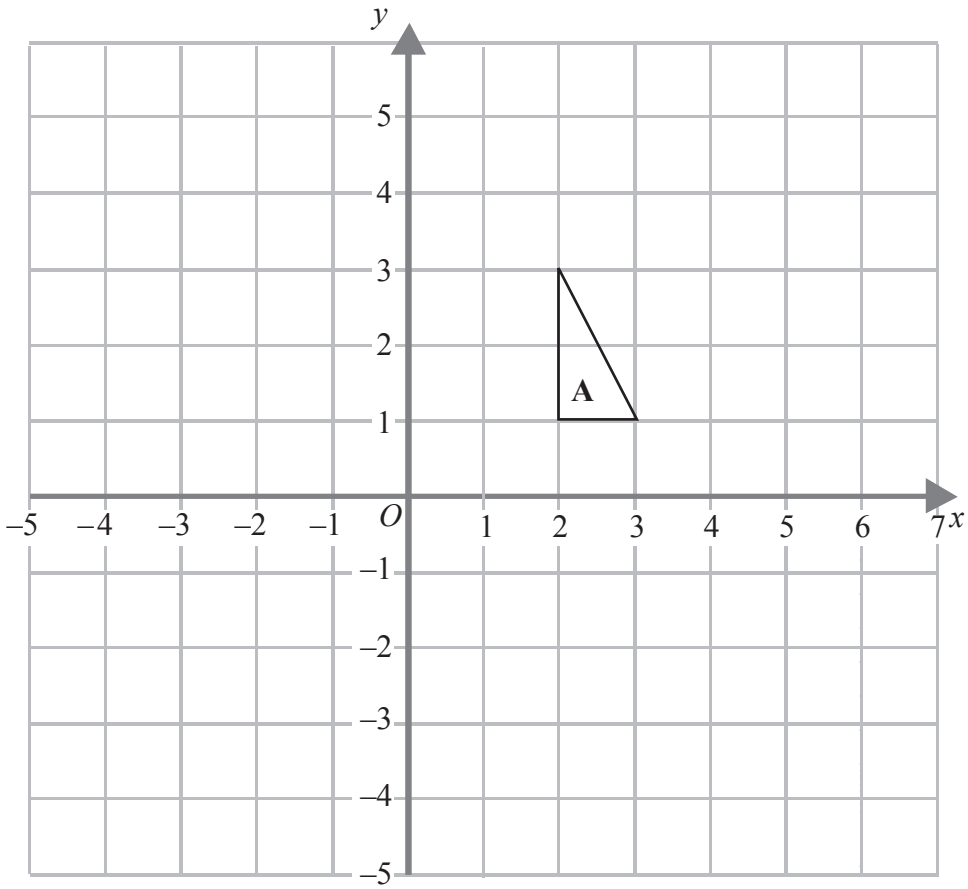
(2)

(b) Describe the single transformation that takes shape **C** to shape **A**.

.....

(2)

21.

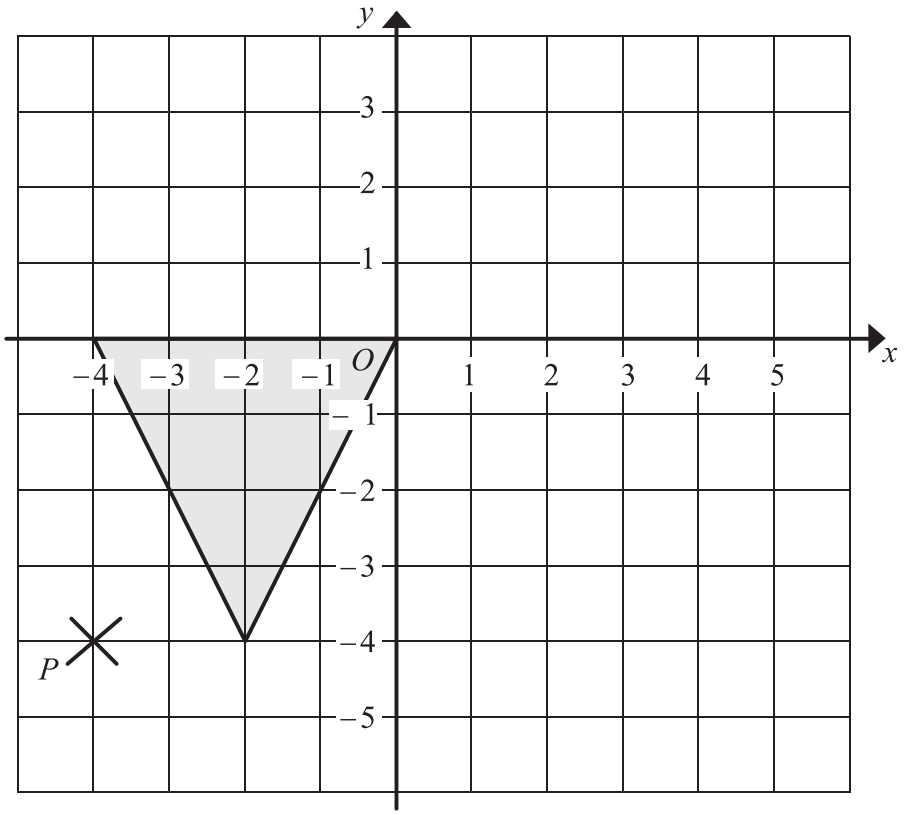


Leave blank

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

(3)

12.

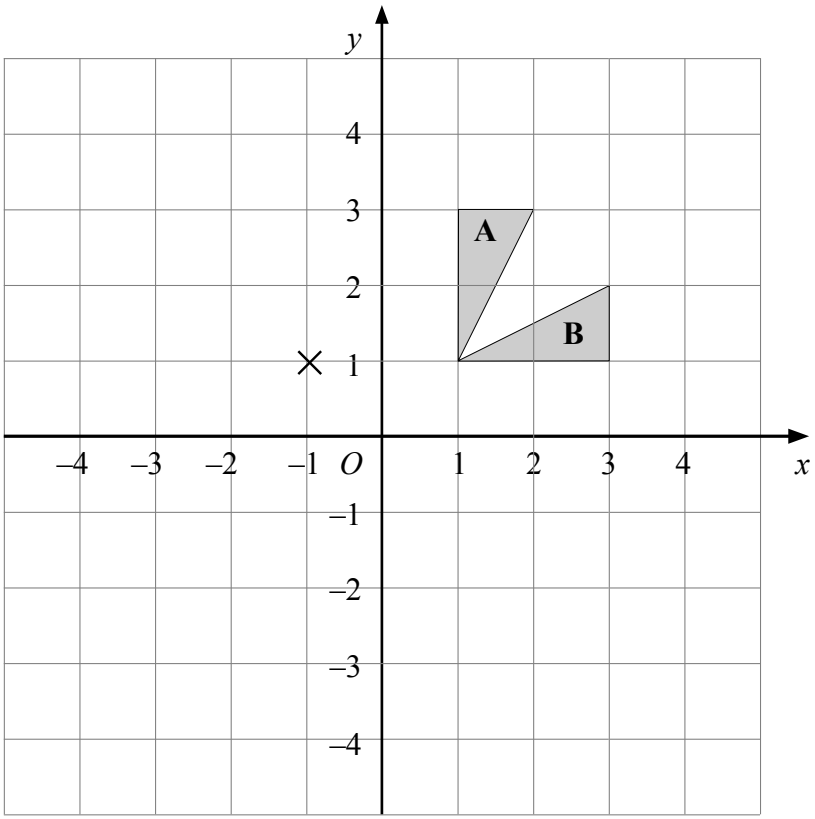


Enlarge the shaded triangle by a scale factor $1\frac{1}{2}$, centre P.

(3)

Blank

6.



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

.....

(2)

(b) On the grid, rotate triangle **A** 90º anticlockwise about the point (–1, 1)

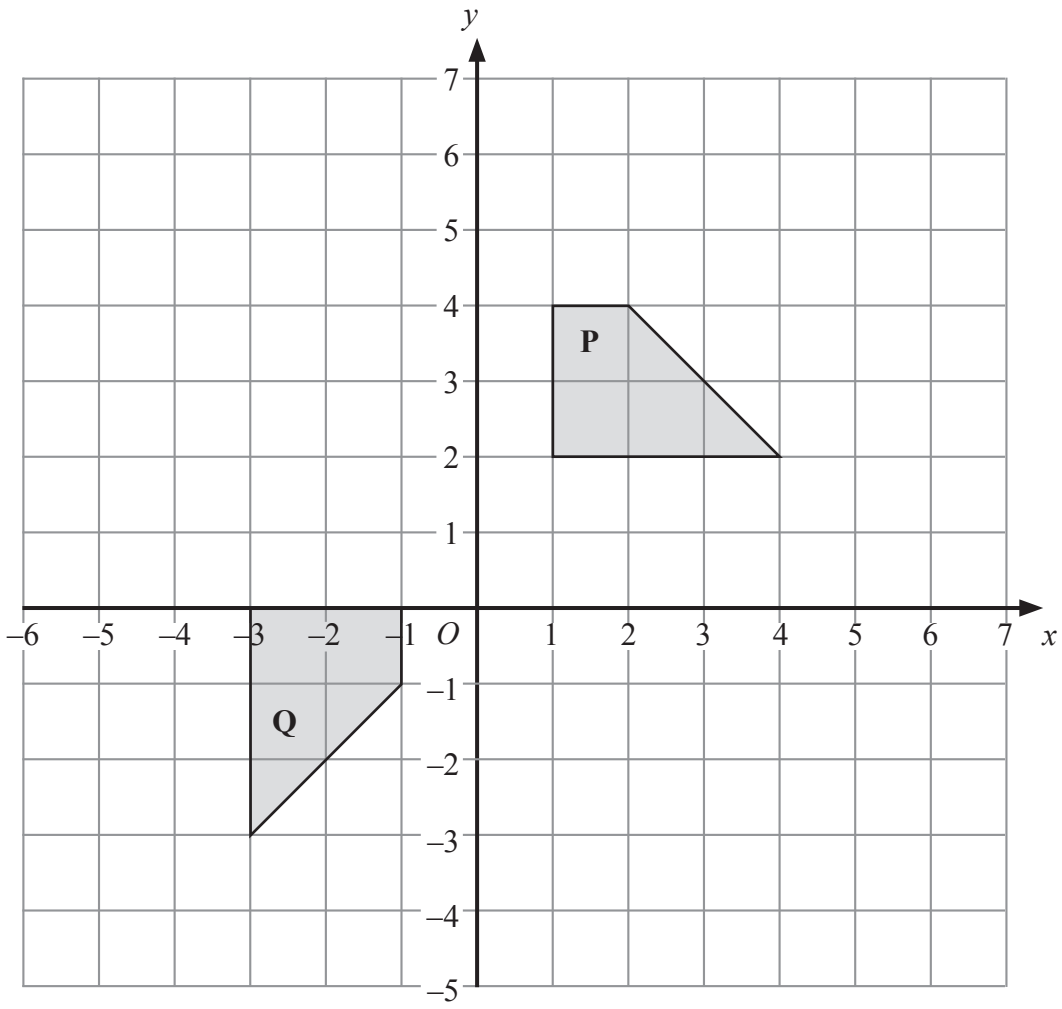
Label your new triangle **C**.

(2)

(Total 4 marks)

Q6

4.



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

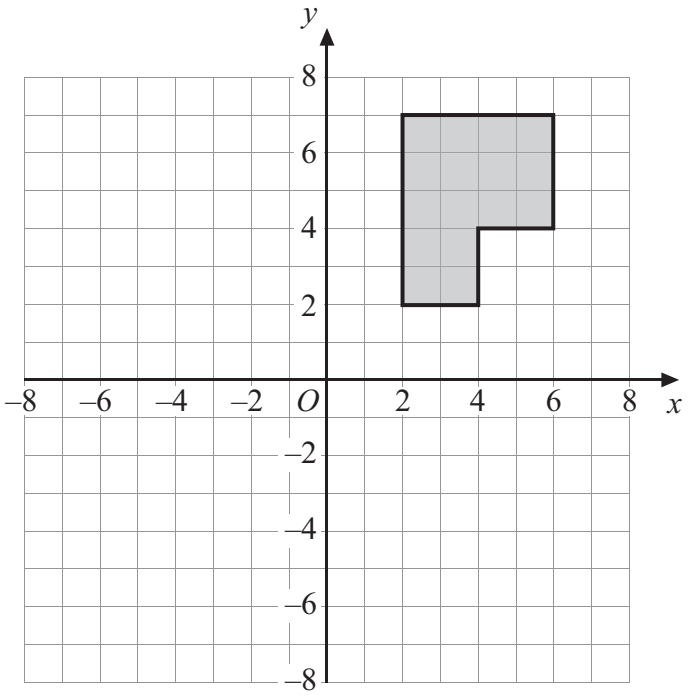
.....

.....

Q4

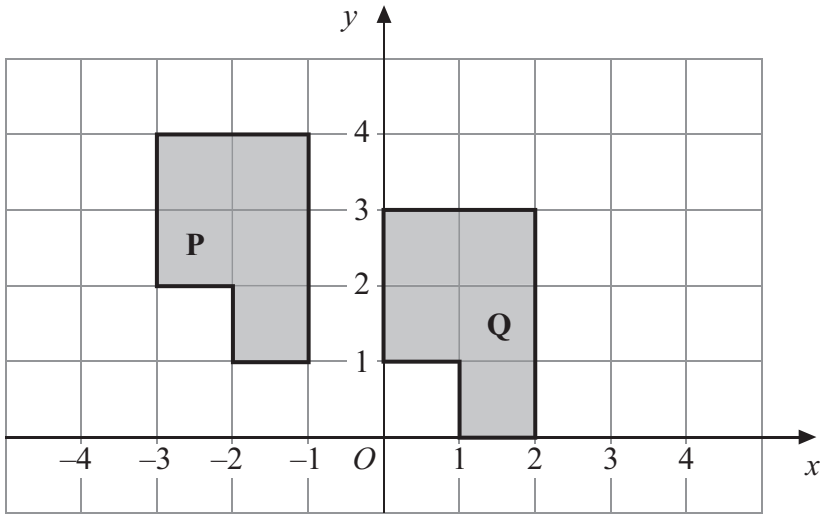
(Total 3 marks)

5.



(a) Rotate the shaded shape 90° clockwise about the point O.

(2)



(b) Describe fully the single transformation that will map shape **P** onto shape **Q**.

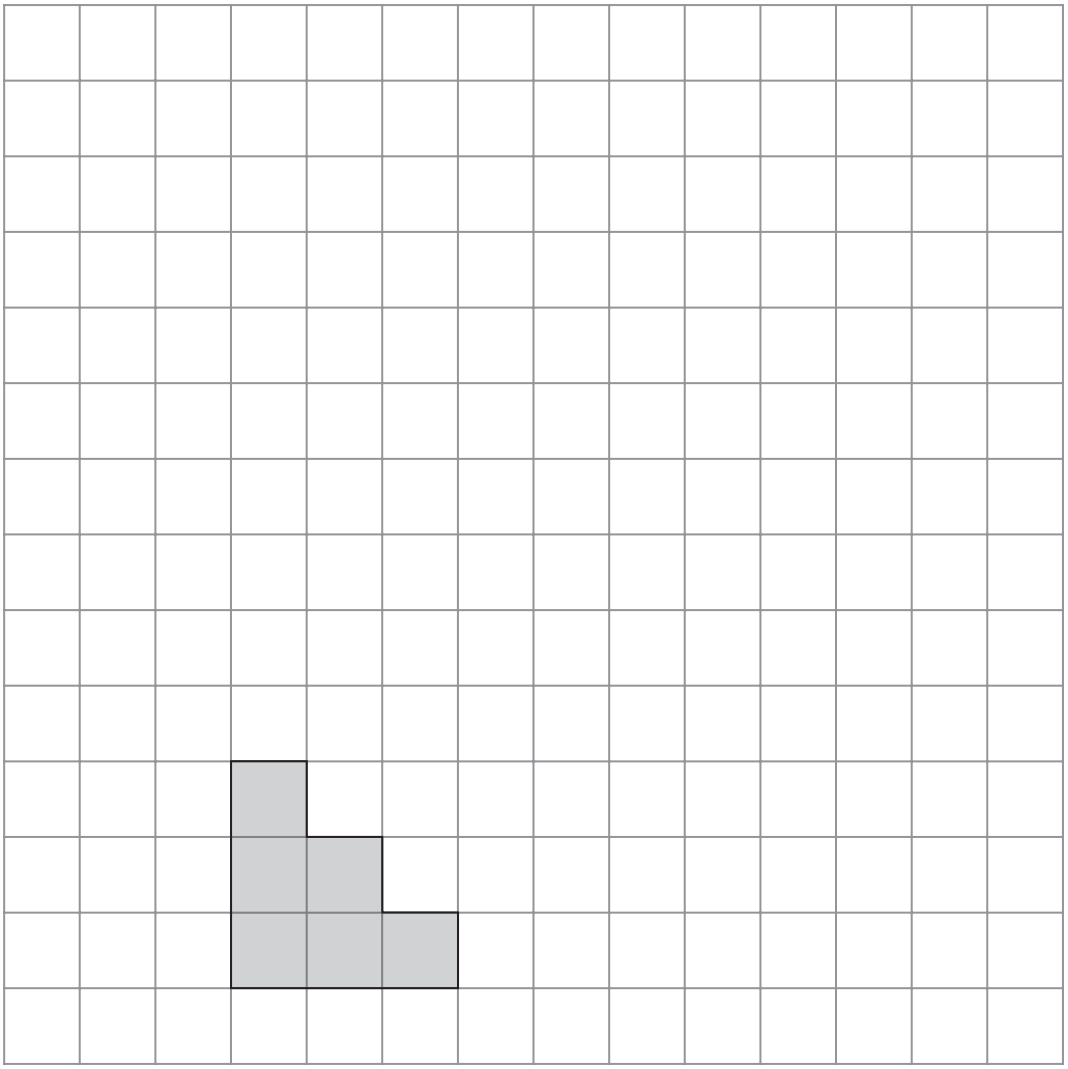
.....

(2)

Q5

(Total 4 marks)

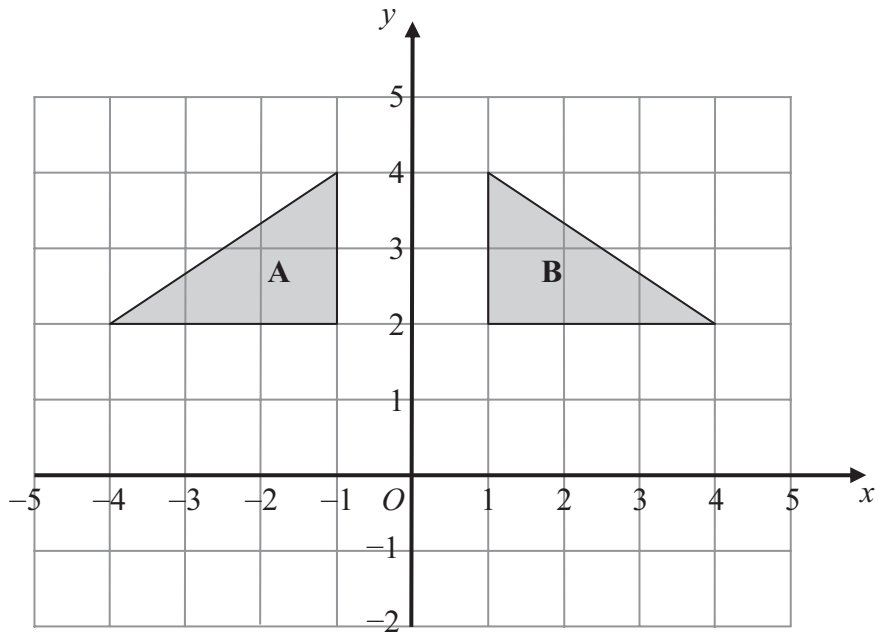
2.



(a) On the grid, draw an enlargement, scale factor 2, of the shaded shape.

(2)

blank



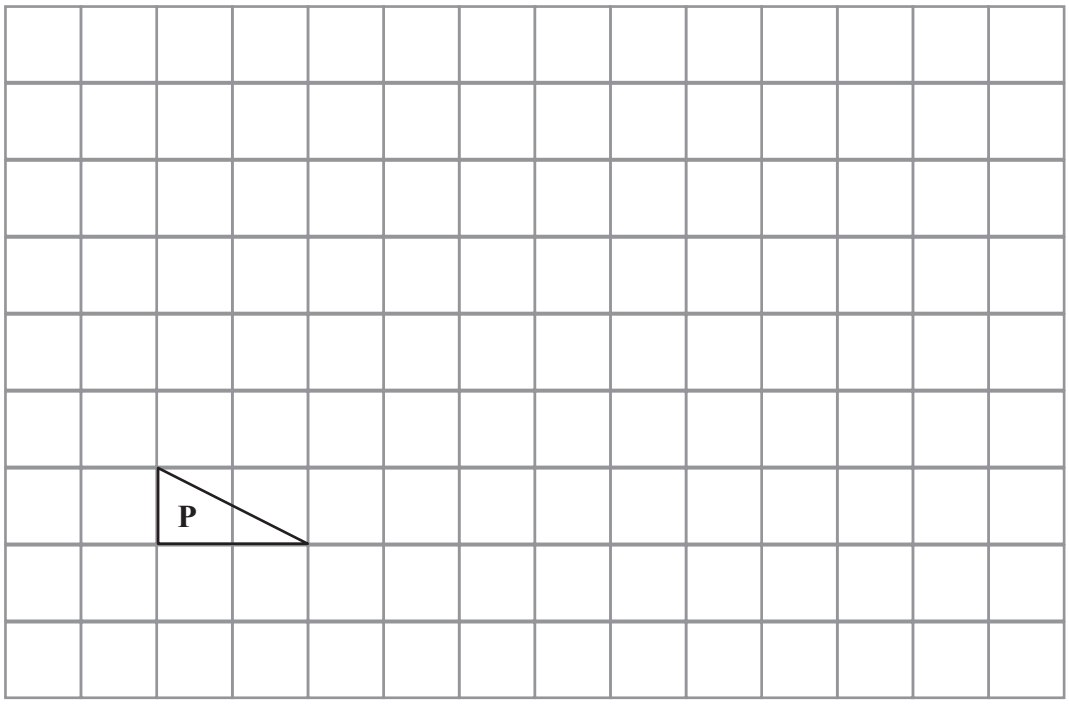
(b) Describe fully the single transformation that maps triangle **A** onto triangle **B**.

.....

(2) **Q2**

(Total 4 marks)

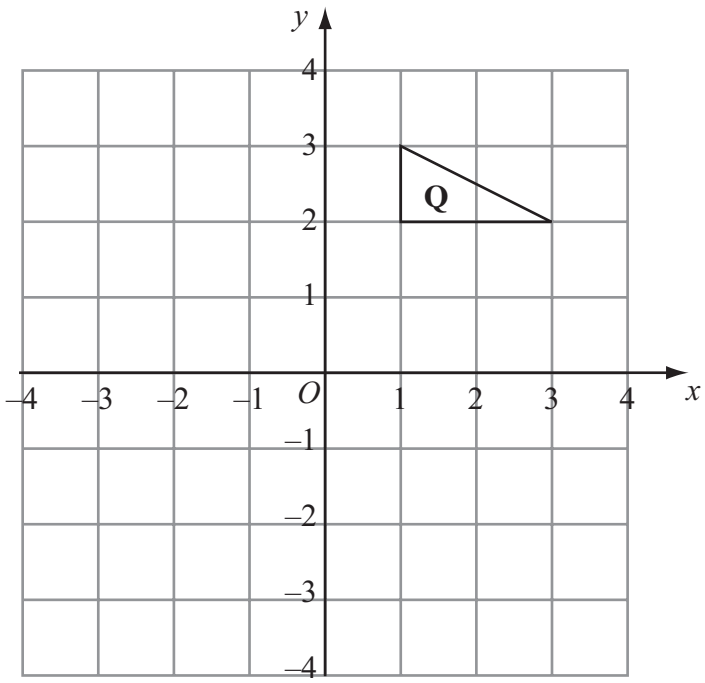
4.



Triangle **P** has been drawn on a grid.

(a) On the grid, draw an enlargement of the triangle **P** with scale factor 3

(2)



Triangle **Q** has been drawn on a grid.

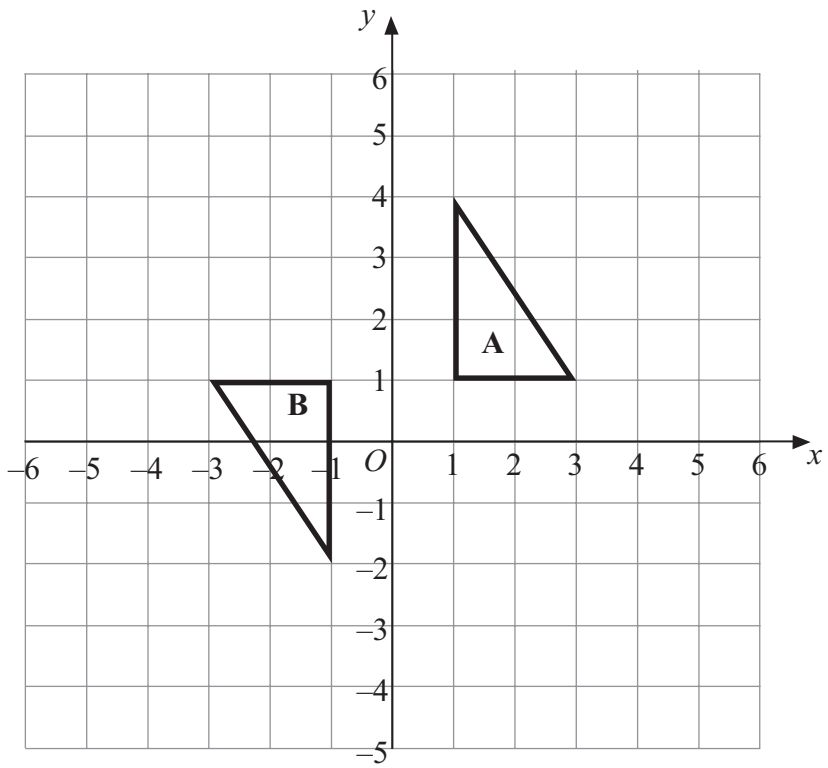
(b) On the grid, rotate triangle **Q** 90° clockwise, centre *O*.

(3)

Q4

(Total 5 marks)

9.



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

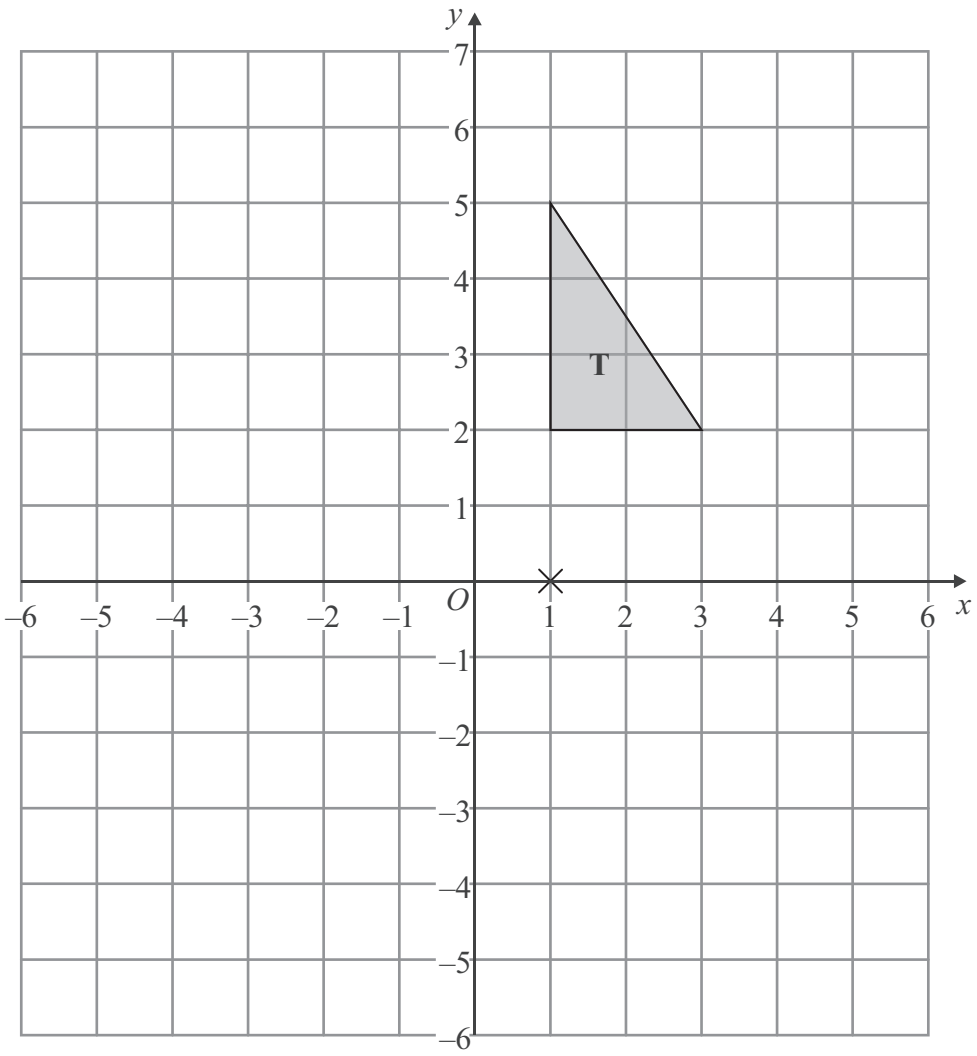
.....

.....

Q9

(Total 3 marks)

5.



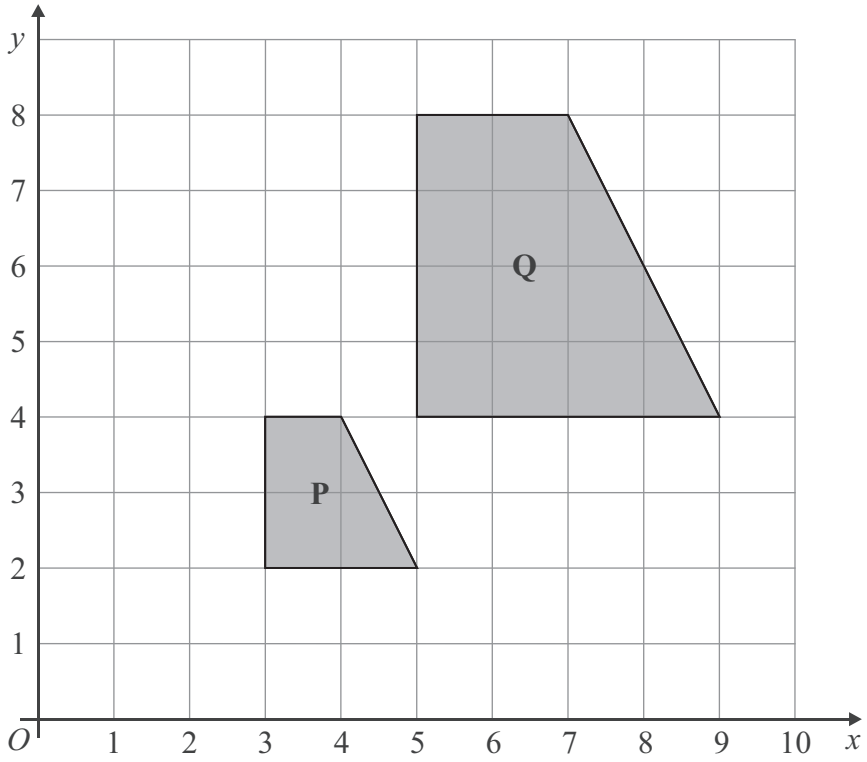
Triangle **T** has been drawn on the grid.

Rotate triangle **T** 180° about the point (1, 0).
Label the new triangle **A**.

Q5

(Total 2 marks)

6.



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

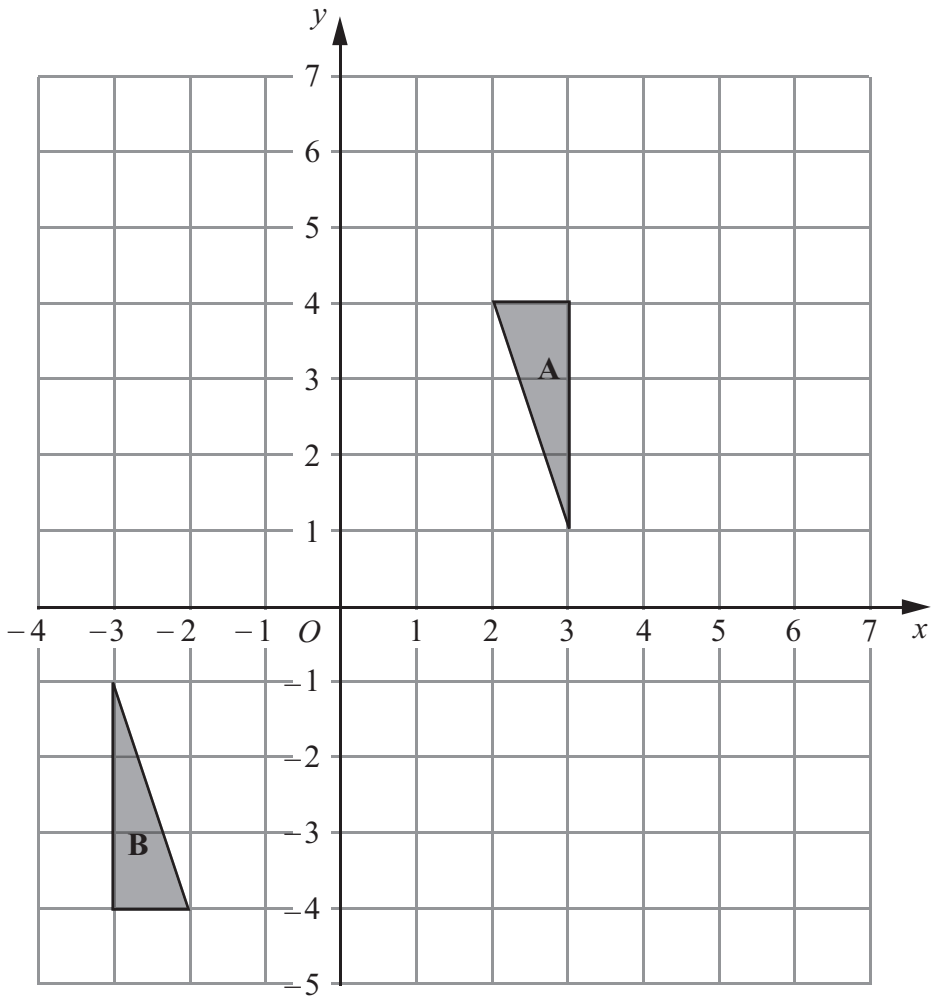
.....

.....

Q6

(Total 3 marks)

12.



Triangle **A** and triangle **B** are drawn on the grid.

(a) Describe fully the single transformation which maps triangle **A** onto triangle **B**.

.....

.....

(3)

(b) Translate triangle **A** by the vector $\begin{pmatrix} 3 \\ 0 \end{pmatrix}$.

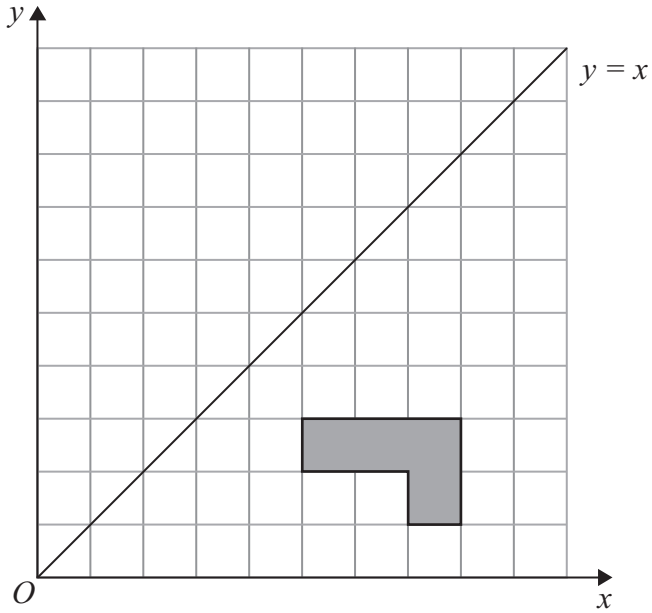
Label the new triangle **C**.

(1)

(Total 4 marks)

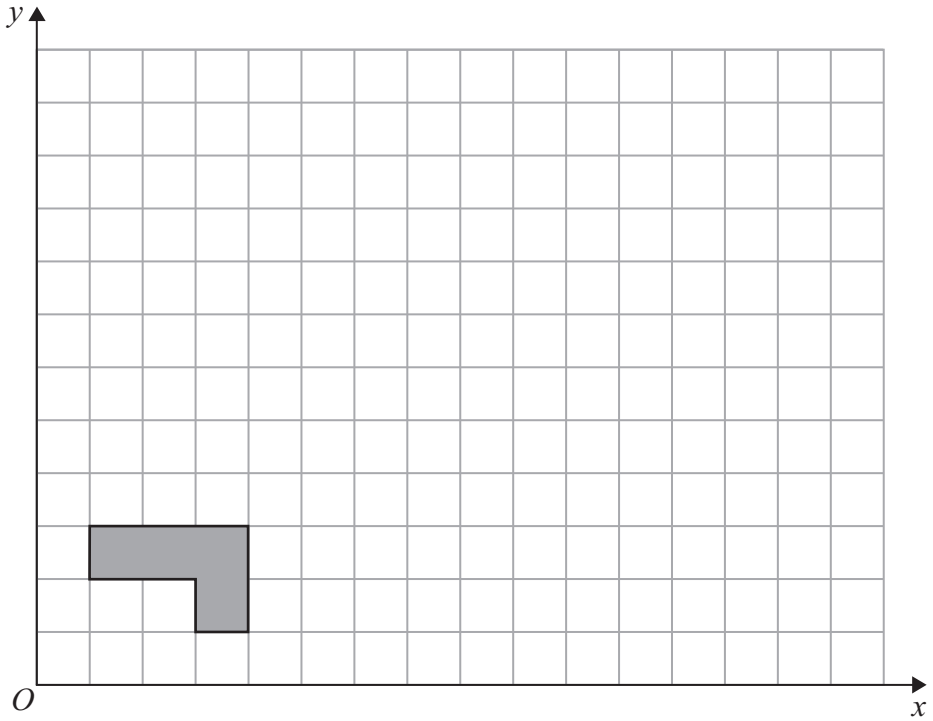
Q12

5.



(a) Reflect the shaded shape in the line $y = x$.

(2)

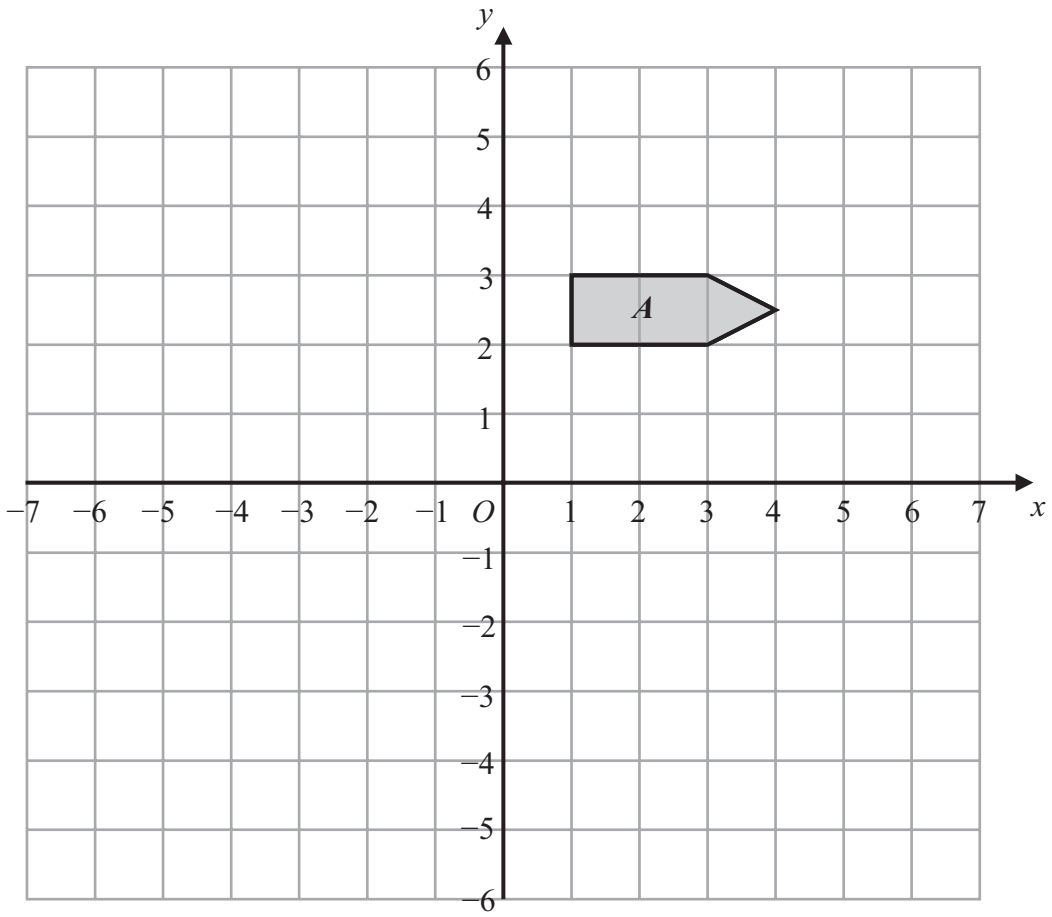


(b) On the grid, enlarge the shaded shape by a scale factor of 3, centre O.

(3) **Q5**

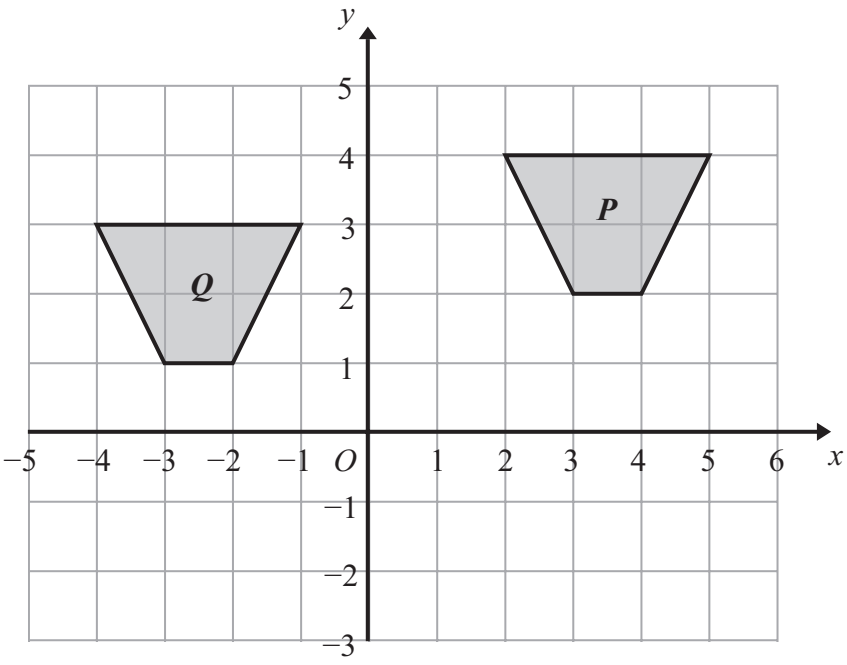
(Total 5 marks)

7.



(a) On the grid above, reflect shape ***A*** in the line $x = -1$

(2)



(b) Describe fully the single transformation that will map shape ***P*** onto shape ***Q***.

.....

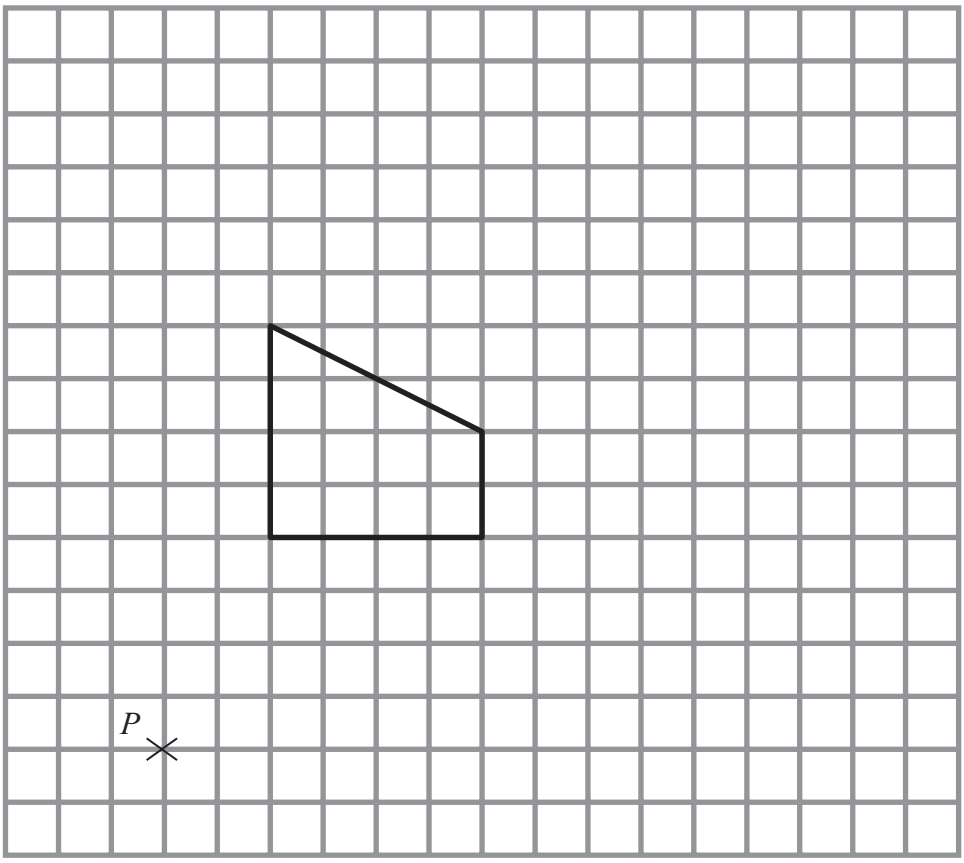
.....

Q7

(2)

(Total 4 marks)

2.

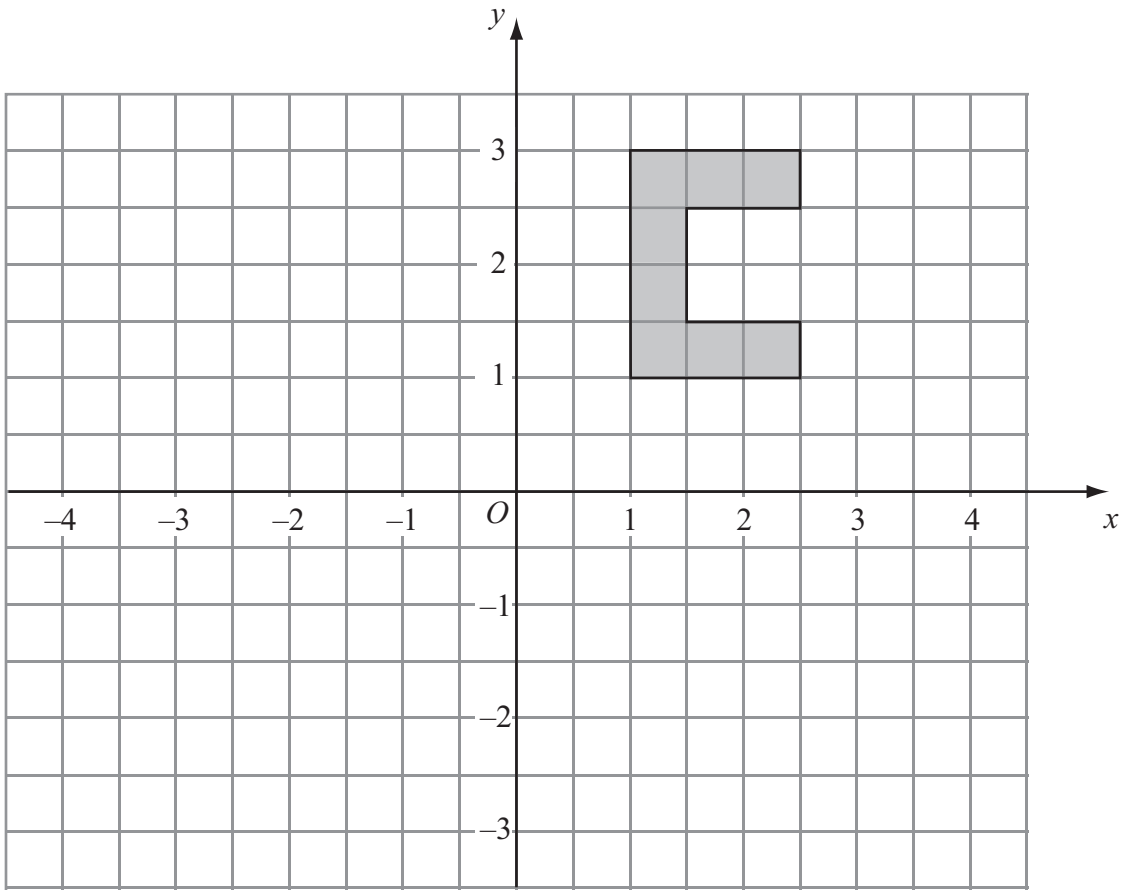


On the grid, enlarge the shape with a scale factor of $\frac{1}{2}$, centre P.

Q2

(Total 3 marks)

8.

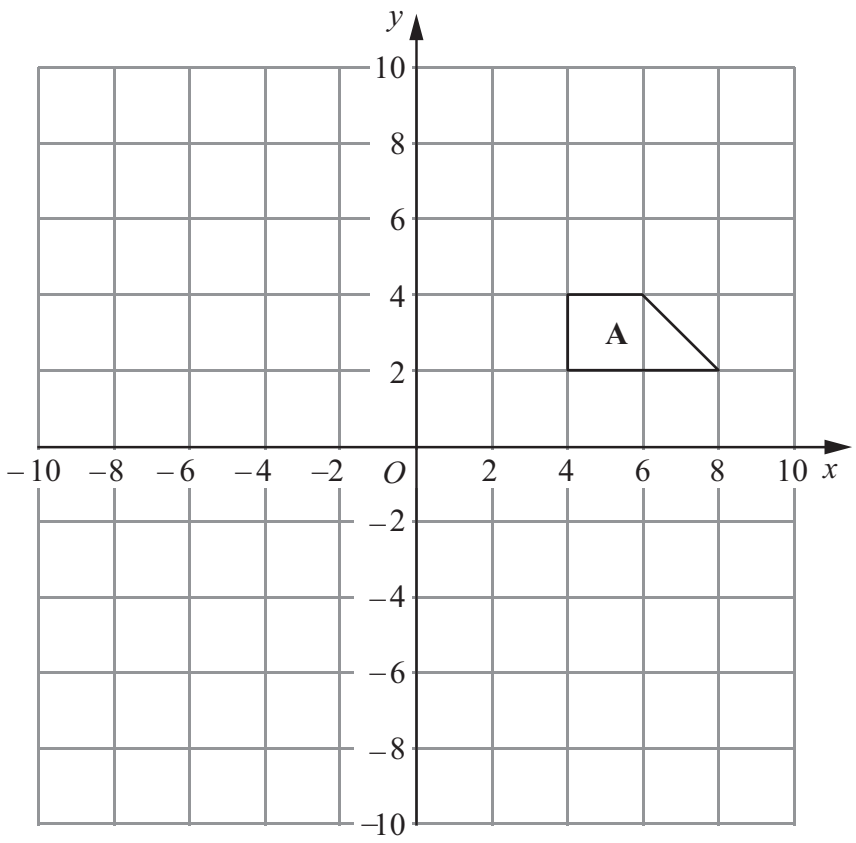


Rotate the shape 90° clockwise, centre O.

Q8

(Total 2 marks)

5.

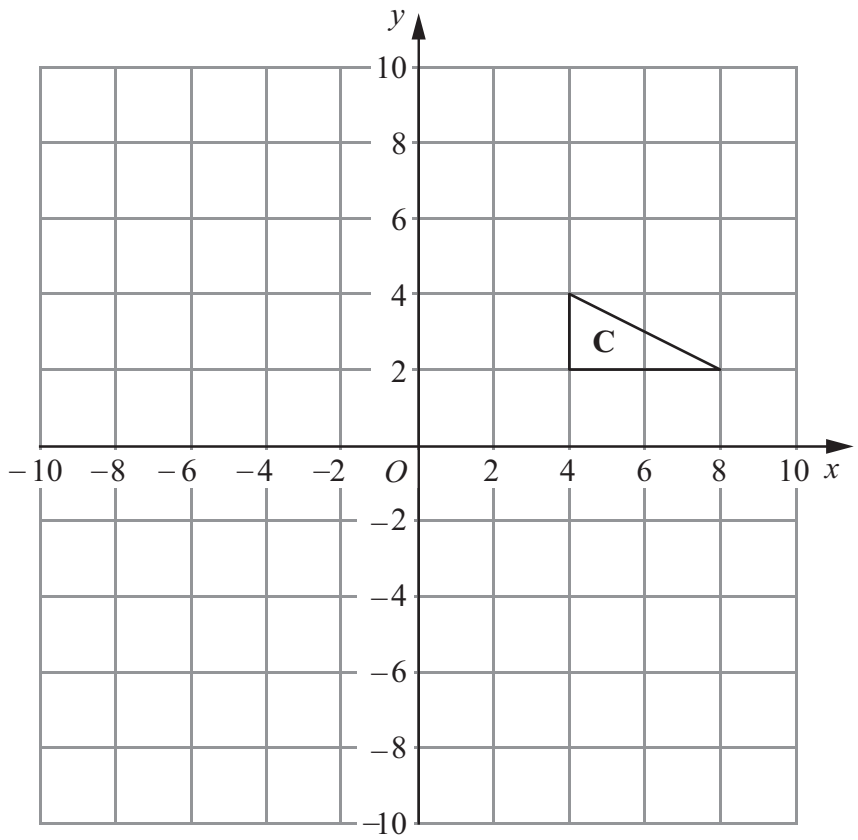


(a) Translate shape **A** by $\begin{pmatrix} -8 \\ -2 \end{pmatrix}$

Label the new shape **B**.

(2)

blank

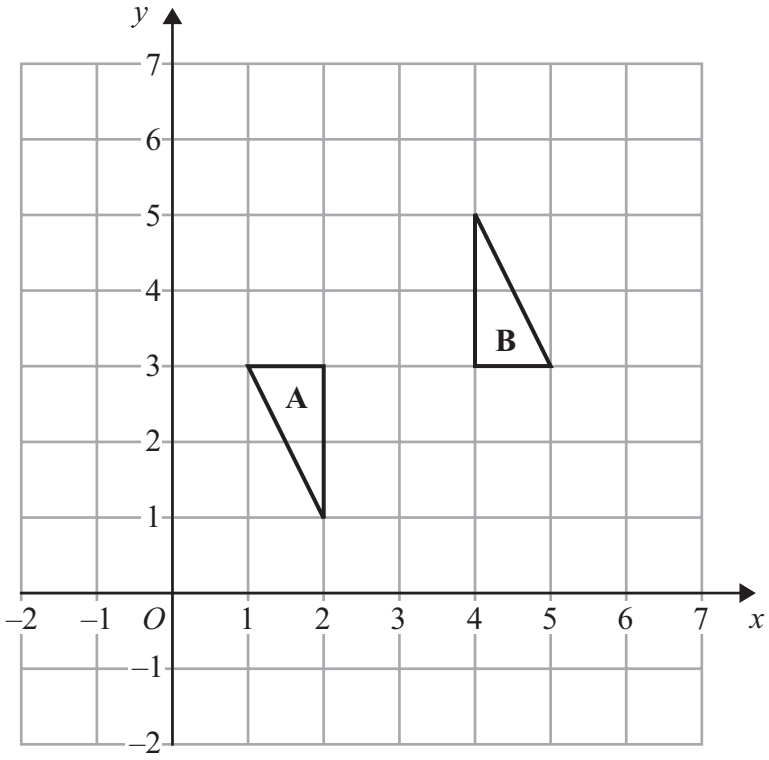


(b) Reflect shape **C** in the line $y = x$.
Label the new shape **D**.

(2) **Q5**

(Total 4 marks)

9



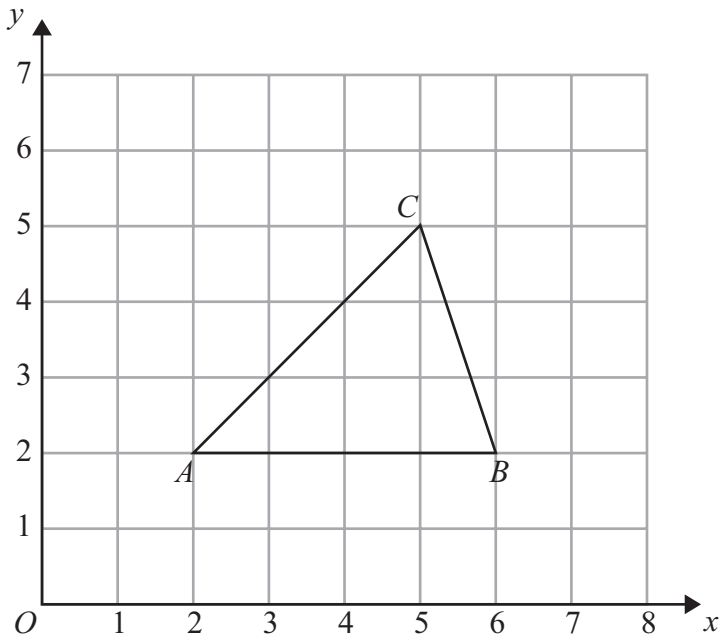
Describe fully the single transformation that maps triangle **A** onto triangle **B**.

.....

.....

(Total for Question 9 is 3 marks)

18



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).

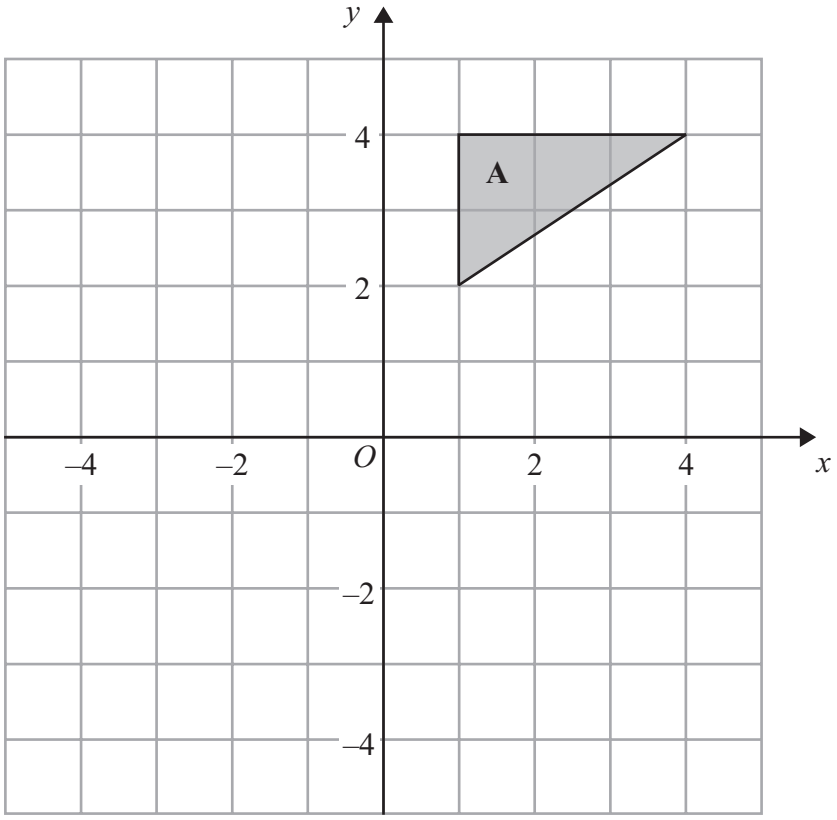
Triangle PQR is an enlargement of triangle ABC with scale factor $\frac{1}{2}$ and centre (0, 0).

Work out the area of triangle PQR.

..... cm^2

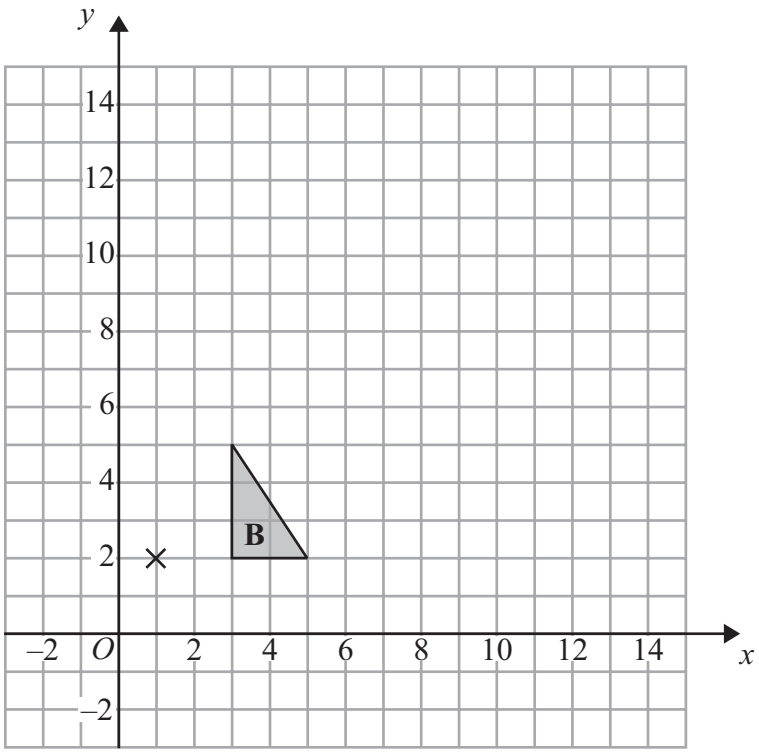
(Total for Question 18 is 3 marks)

8



(a) Rotate triangle **A** 90° clockwise, centre O.

(2)



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

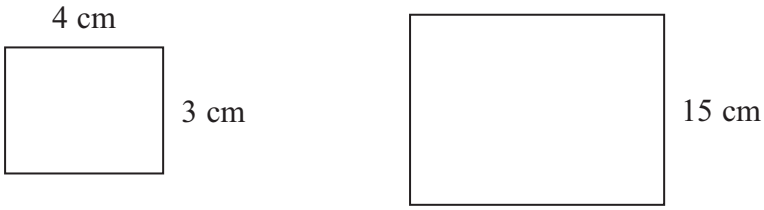
(3)

(Total for Question 8 is 5 marks)

1 A small photograph has a length of 4 cm and a width of 3 cm.
Shez enlarges the small photograph to make a large photograph.

The large photograph has a width of 15 cm.

Diagram **NOT** accurately drawn



Small photograph

Large photograph

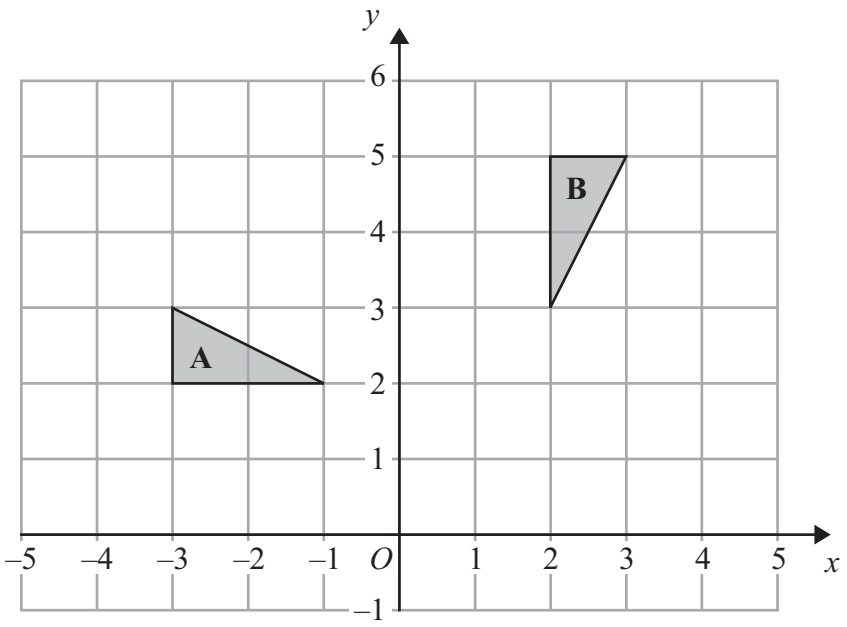
The two photographs are similar rectangles.

Work out the length of the large photograph.

.....

(Total for Question 1 is 3 marks)

6



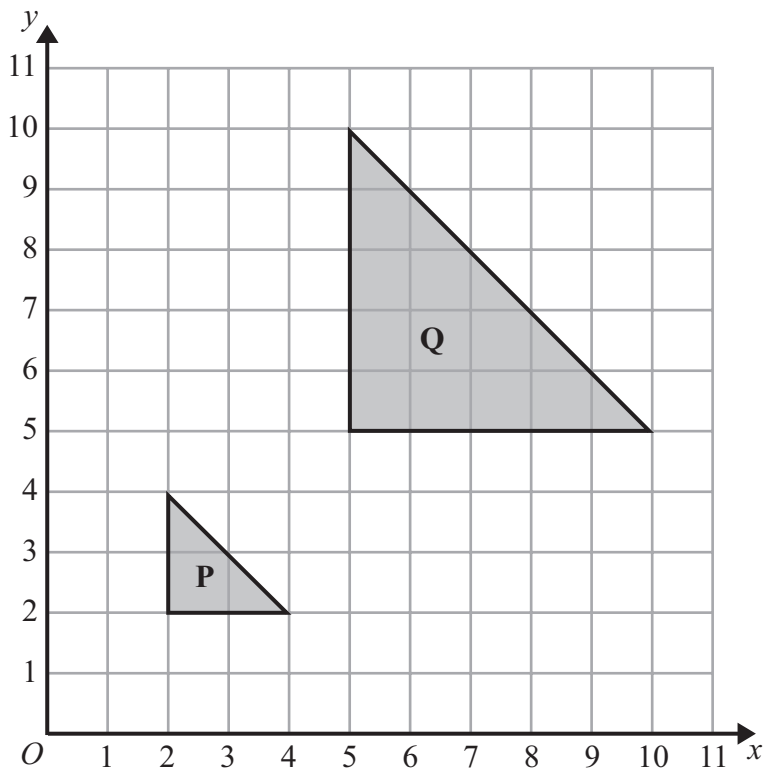
Describe fully the single transformation which maps triangle **A** onto triangle **B**.

.....

.....

(Total for Question 6 is 3 marks)

6



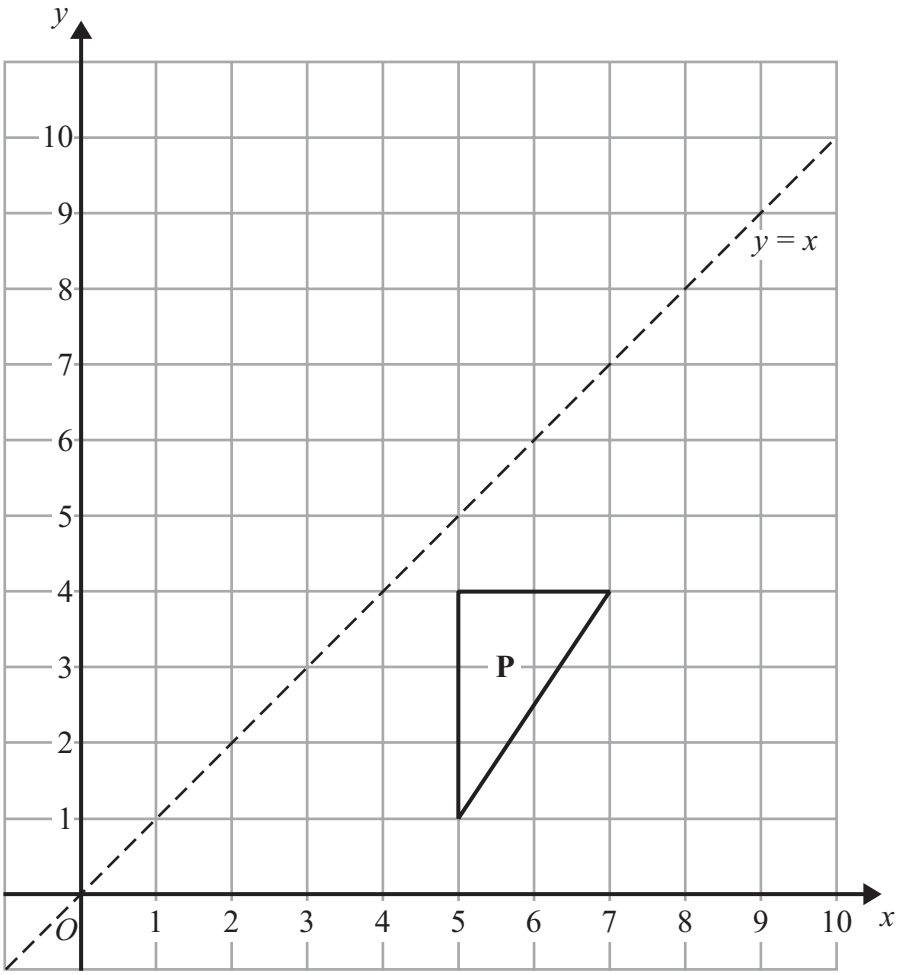
Describe fully the single transformation that maps shape **P** onto shape **Q**.

.....

.....

(Total for Question 6 is 3 marks)

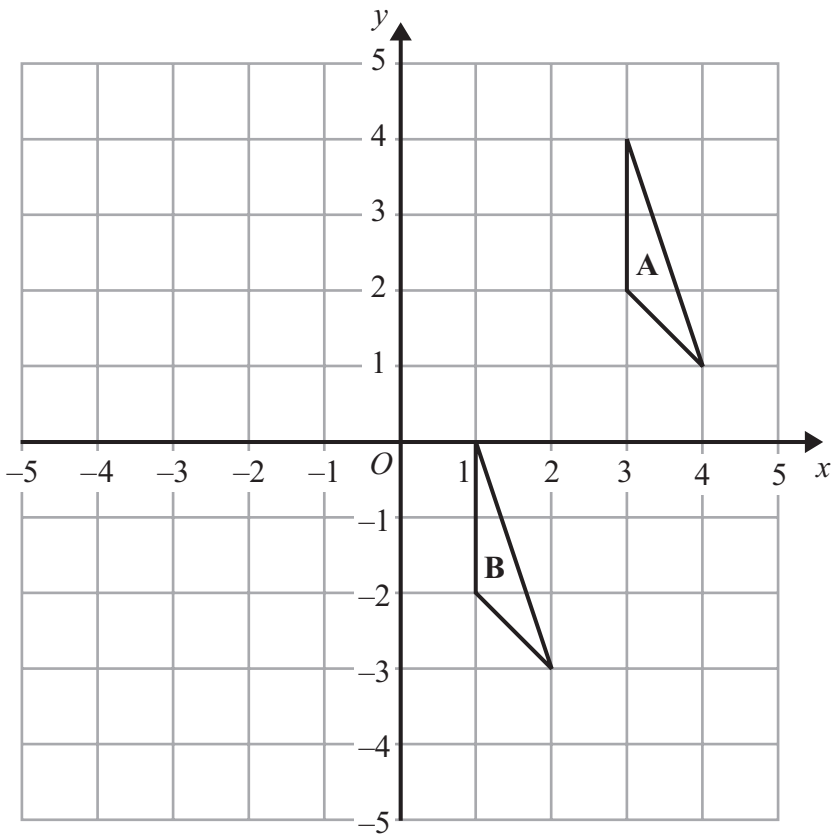
2 (a)



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

(2)

(b)



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

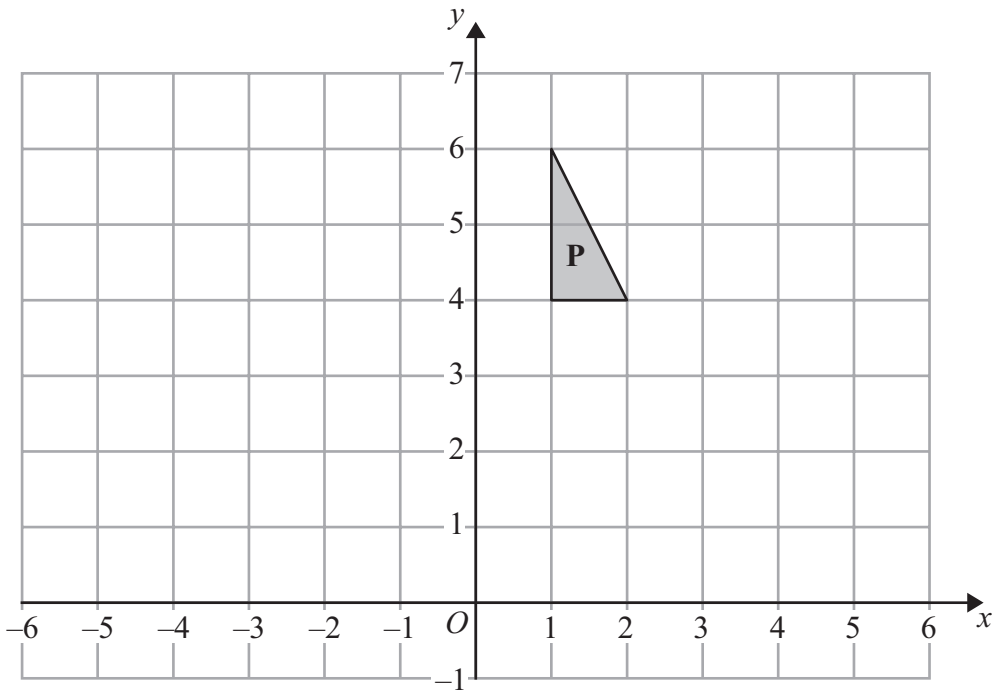
.....

.....

(2)

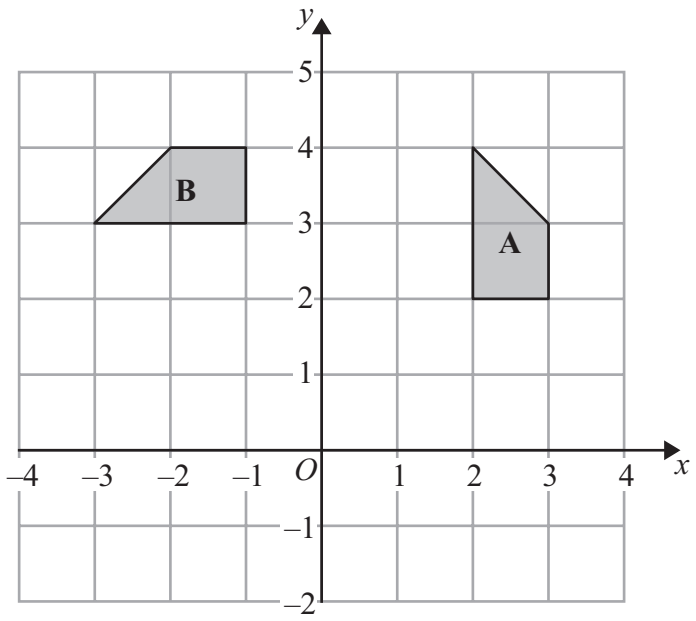
(Total for Question 2 is 4 marks)

10



(a) Reflect shape **P** in the line $x = 3$

(2)



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

.....

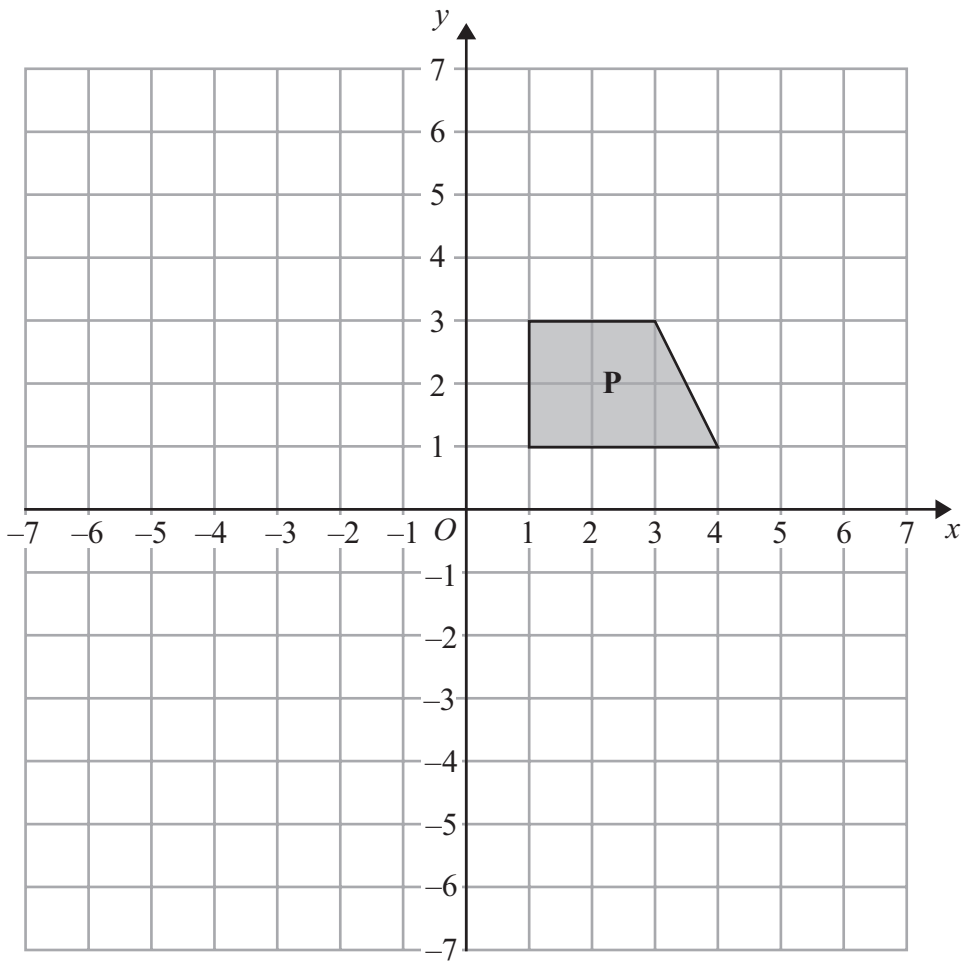
.....

.....

(3)

(Total for Question 10 is 5 marks)

18



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**.

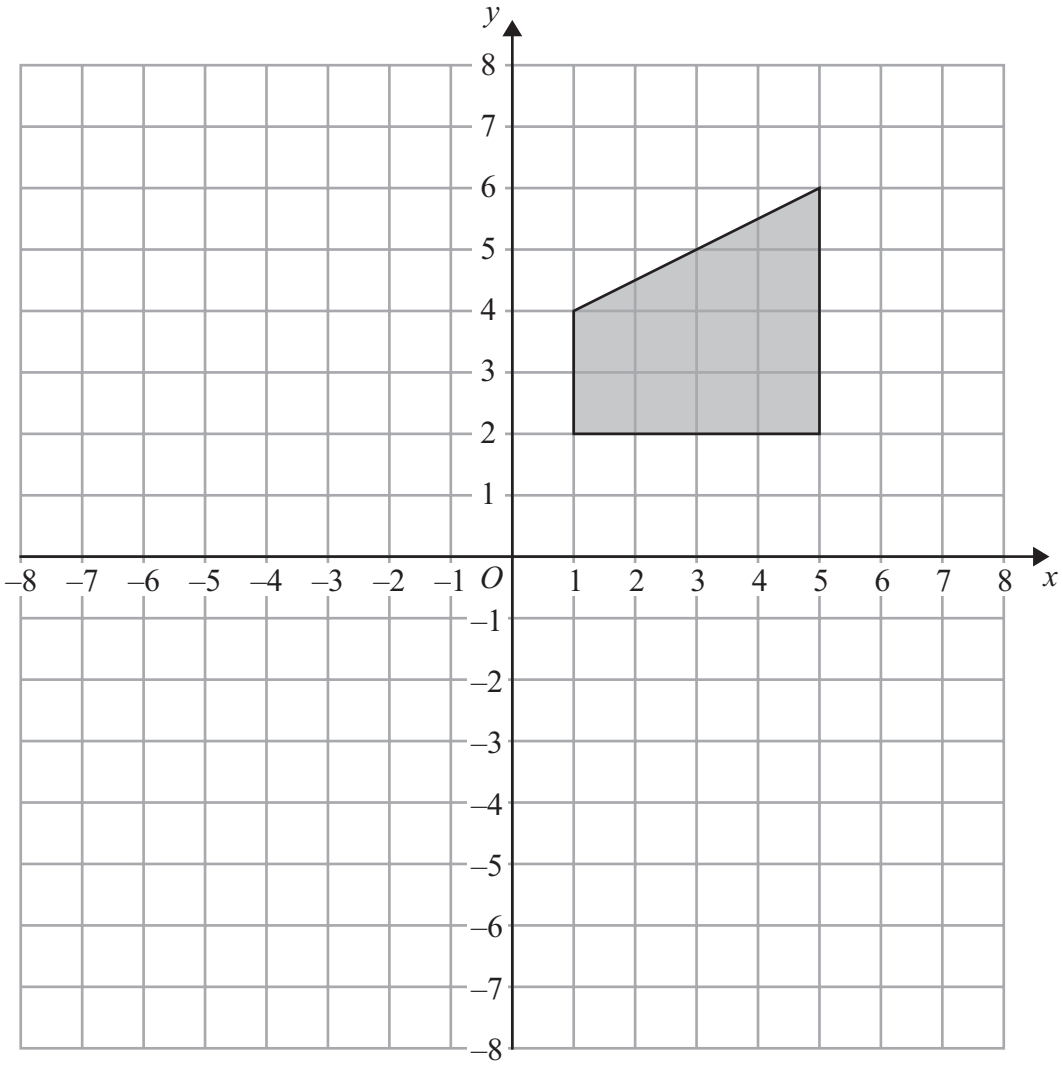
Describe fully the **single** transformation that maps shape **P** onto shape **R**.

.....

.....

(Total for Question 18 is 3 marks)

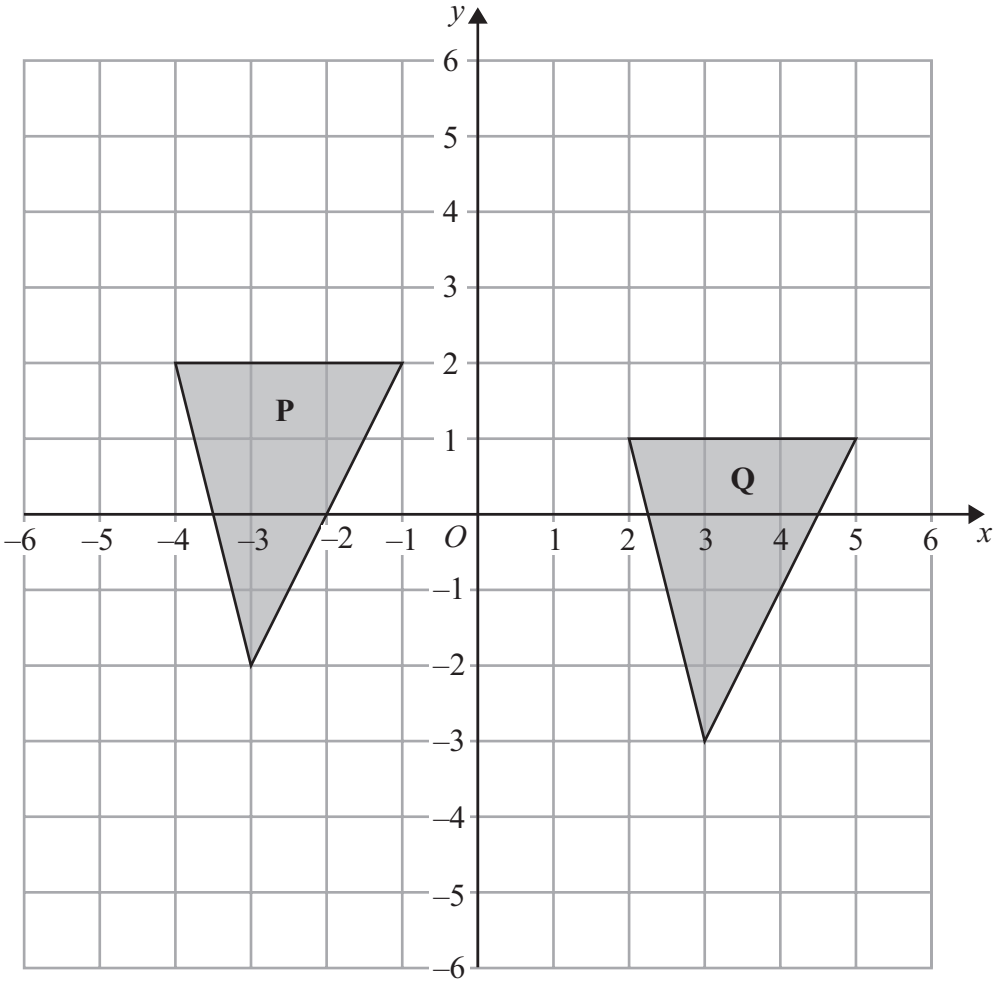
22



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

(Total for Question 22 is 3 marks)

10



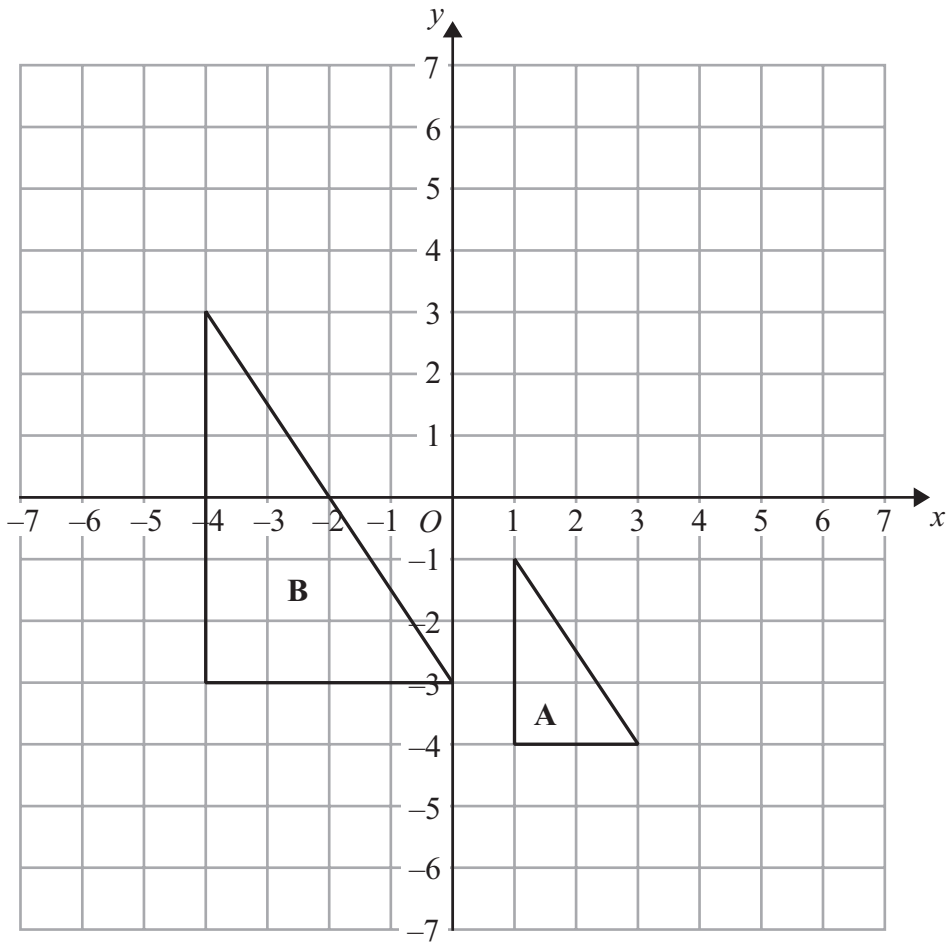
Describe fully the single transformation that maps triangle **P** onto triangle **Q**.

.....

.....

(Total for Question 10 is 2 marks)

7



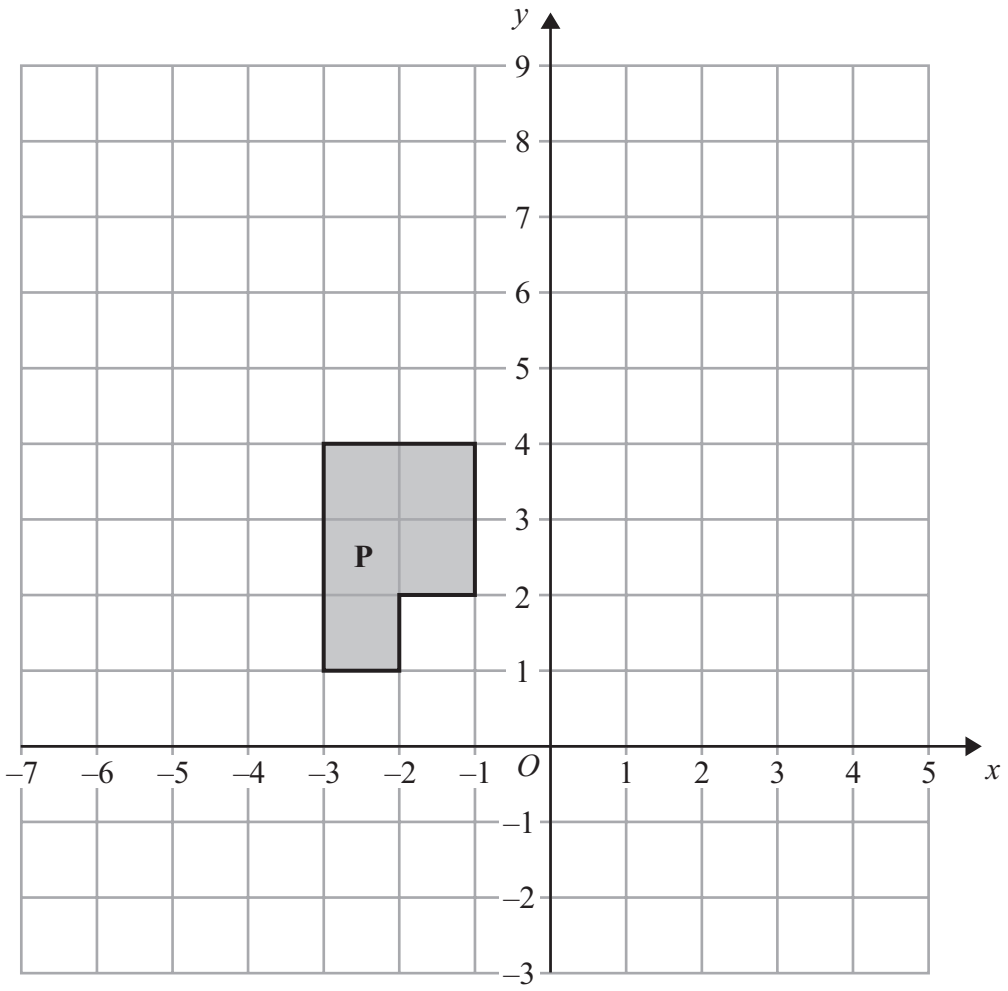
Describe fully the single transformation that maps triangle **A** onto triangle **B**.

.....

.....

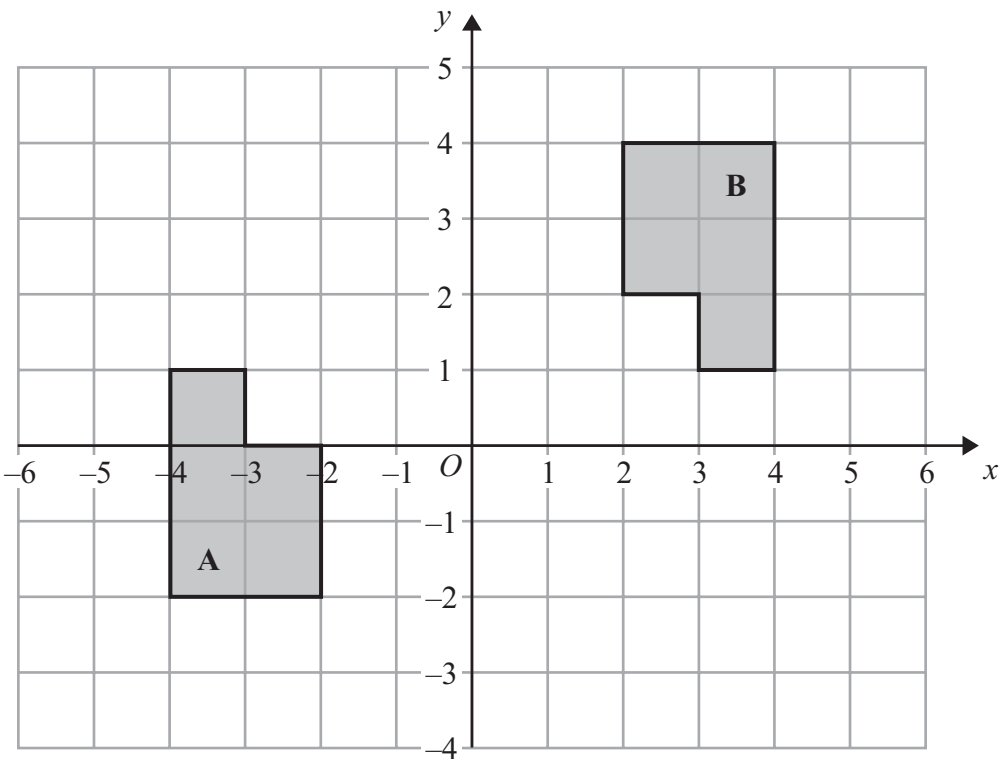
(Total for Question 7 is 3 marks)

7



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

(2)



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

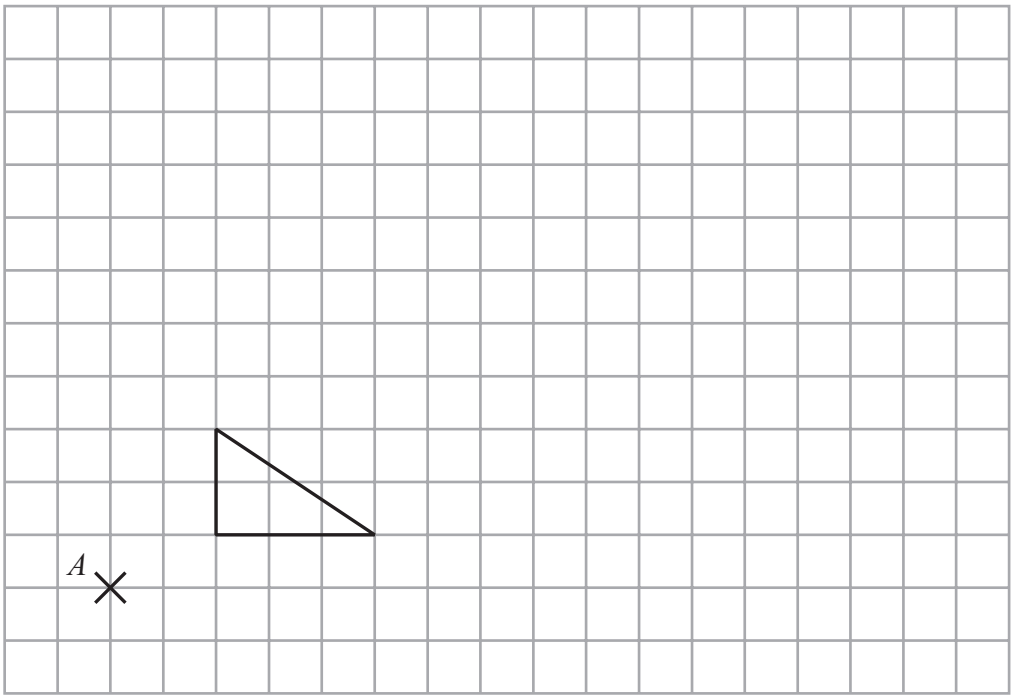
.....

.....

(3)

(Total for Question 7 is 5 marks)

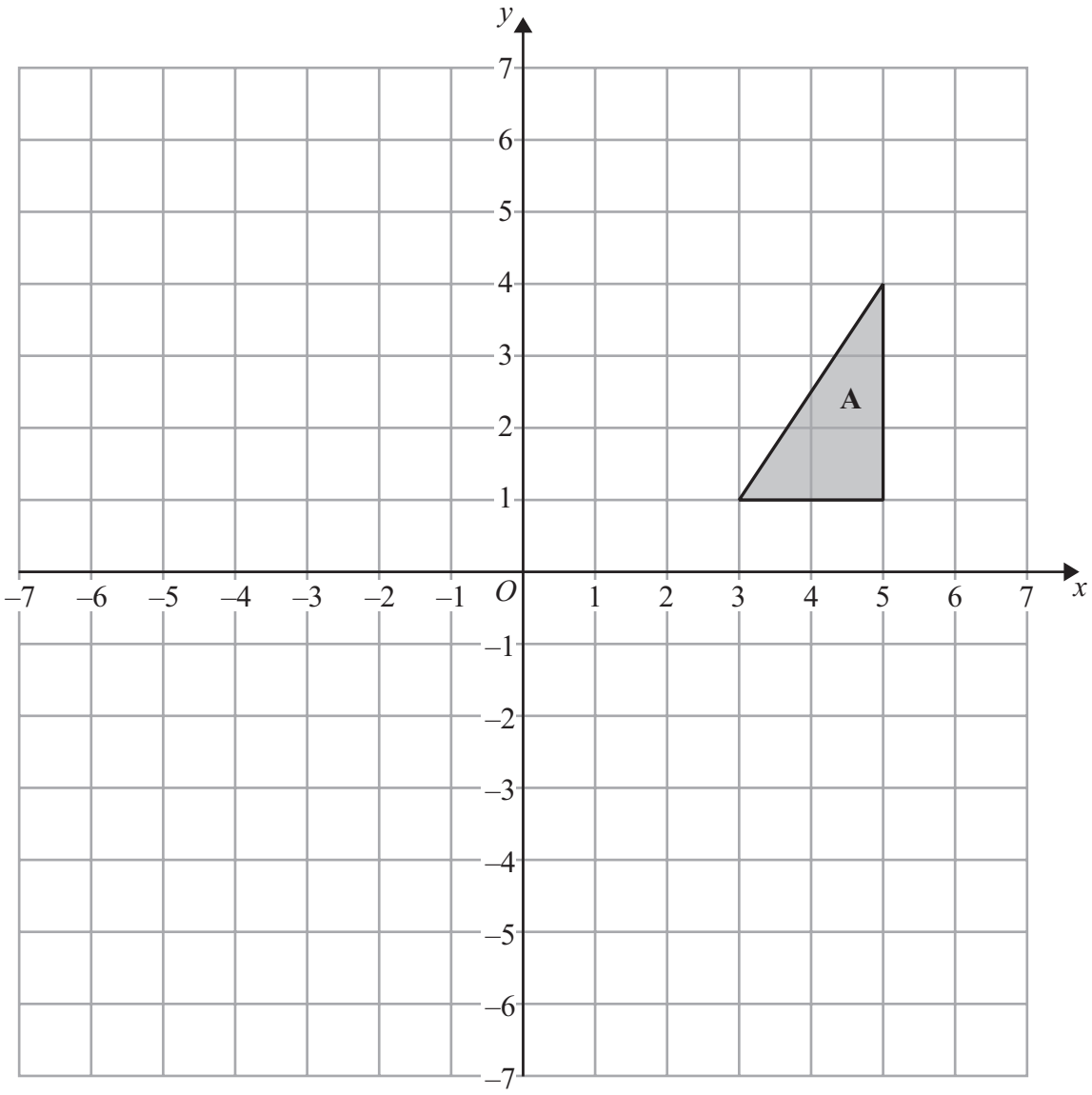
2



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

(Total for Question 2 is 3 marks)

14



Triangle **A** is reflected in the x-axis to give triangle **B**.
Triangle **B** is then reflected in the line $x = 1$ to give triangle **C**.

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

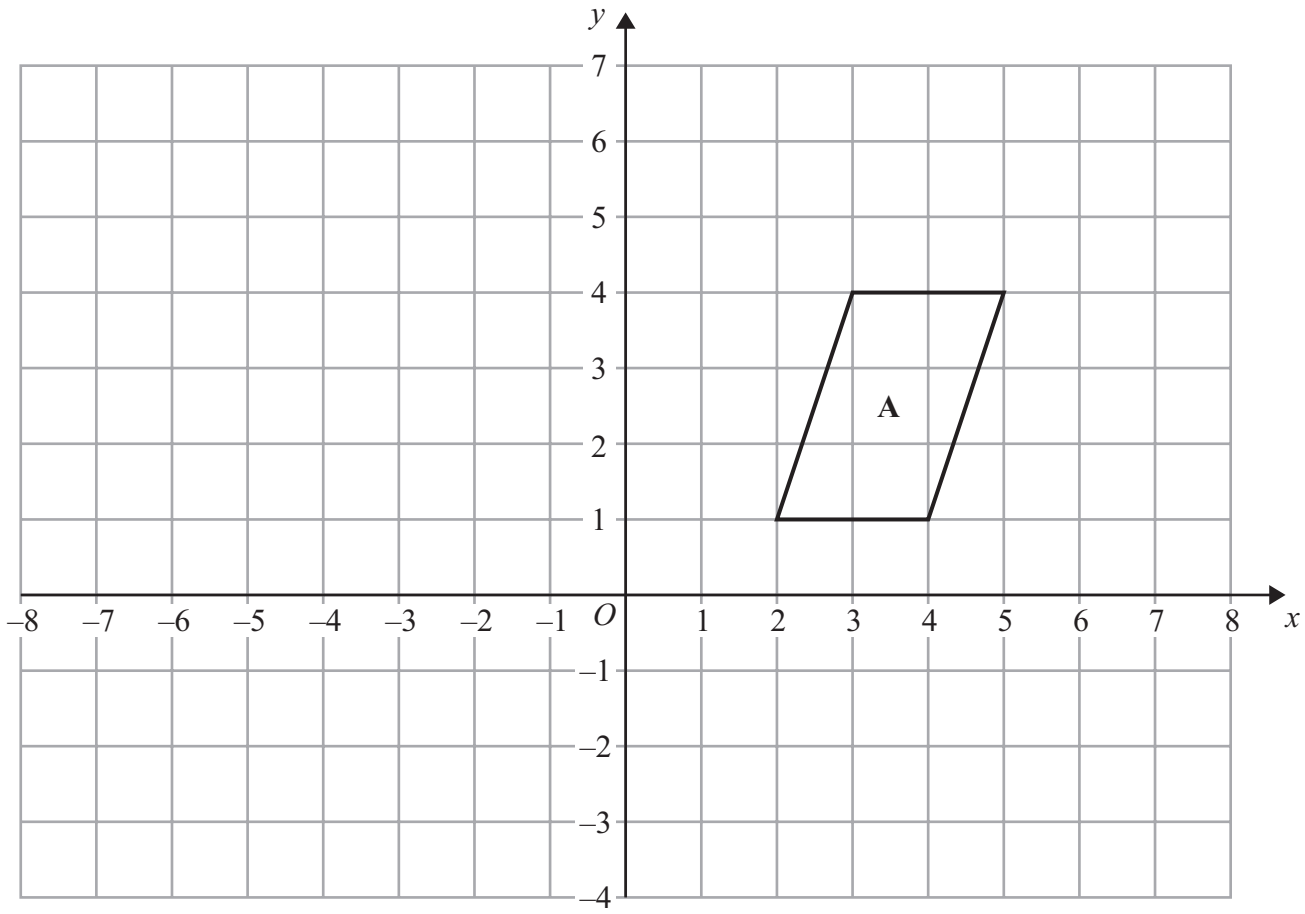
.....

.....

.....

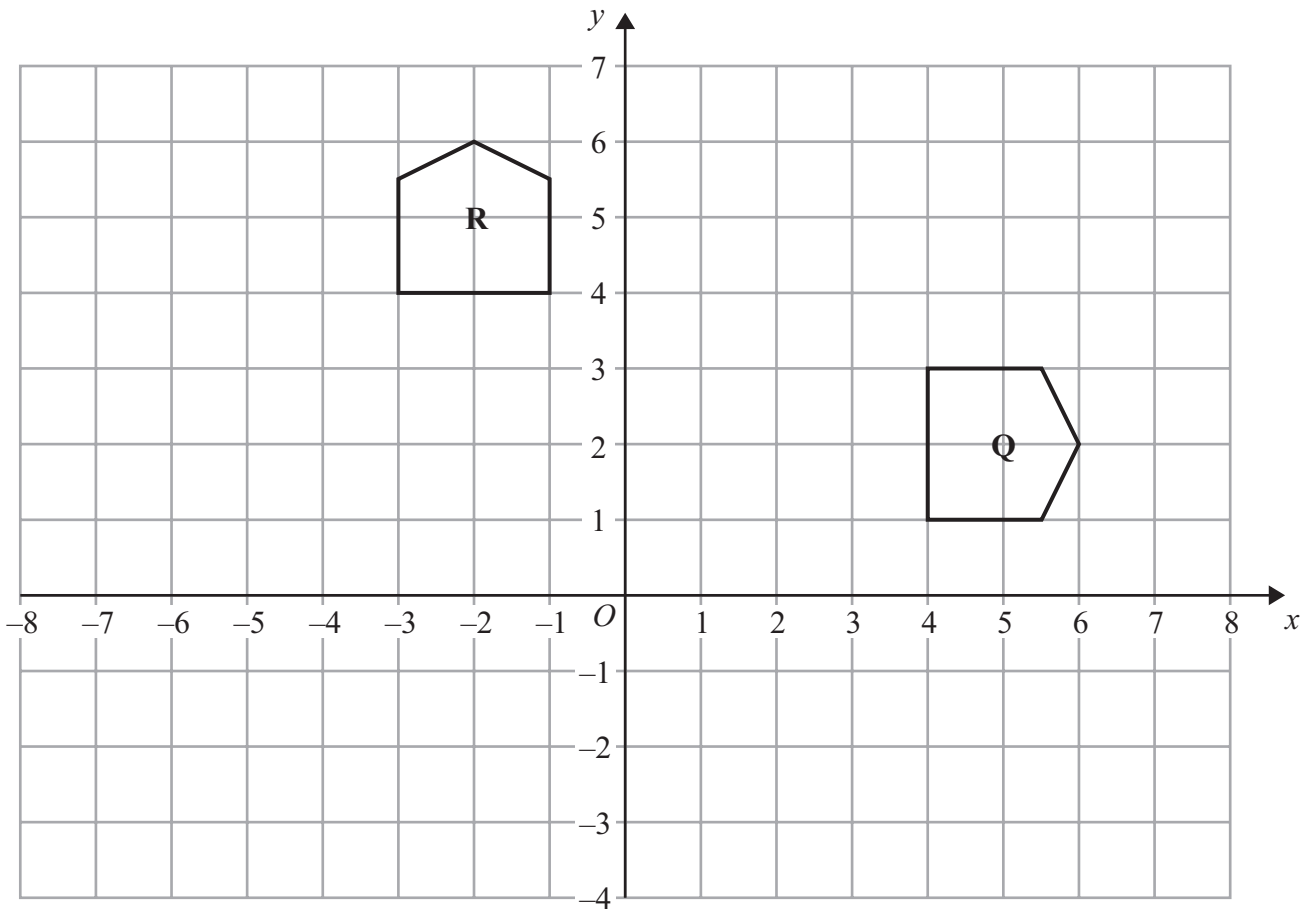
(Total for Question 14 is 3 marks)

6



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

(1)



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

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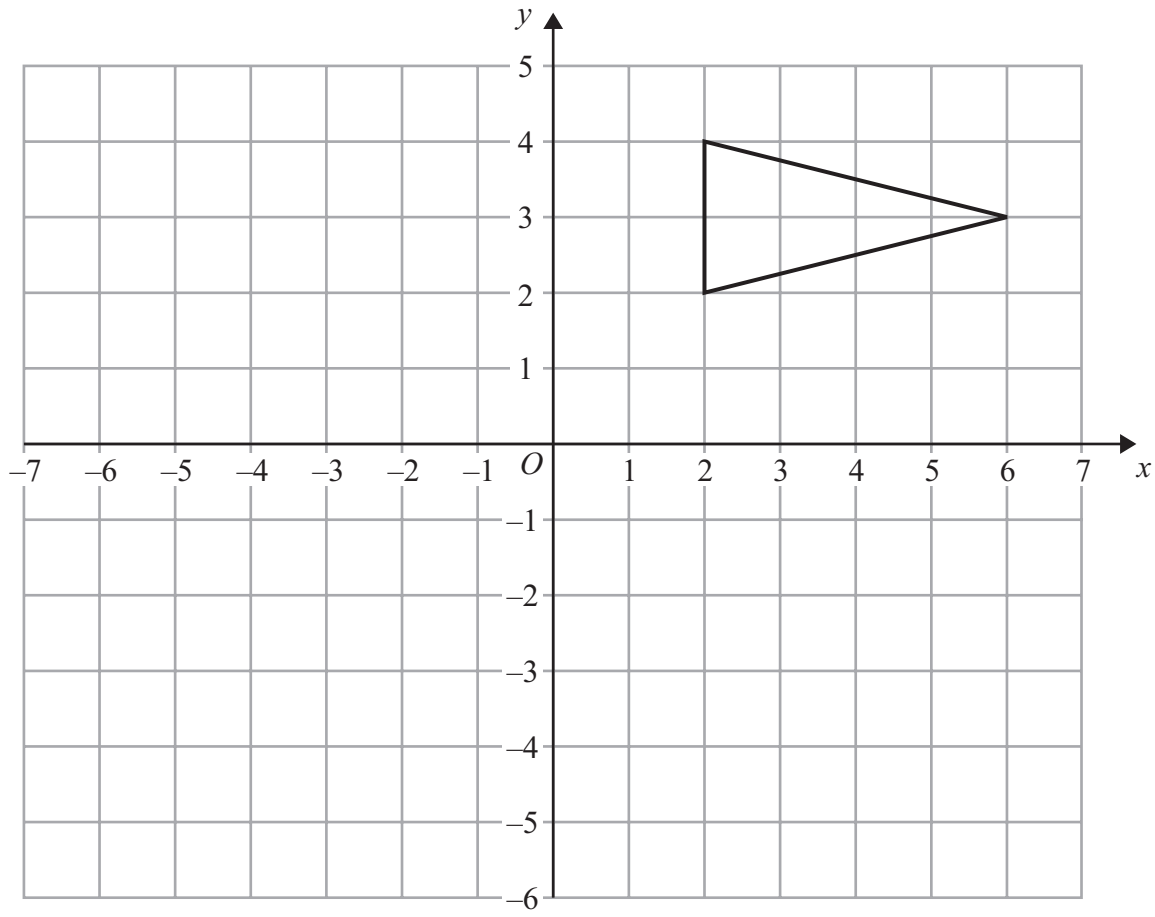
.....

(3)

(Total for Question 6 is 4 marks)

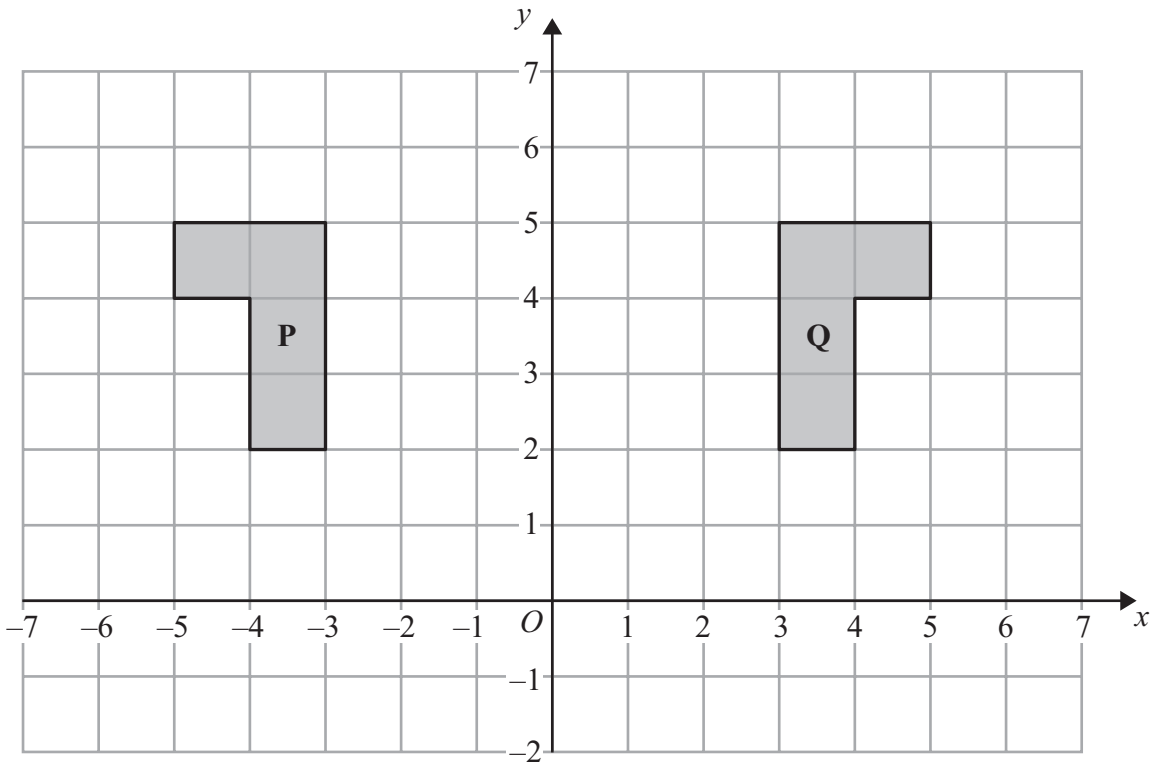
23



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

(Total for Question 23 is 2 marks)

1 Two shapes are shown on the grid.



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

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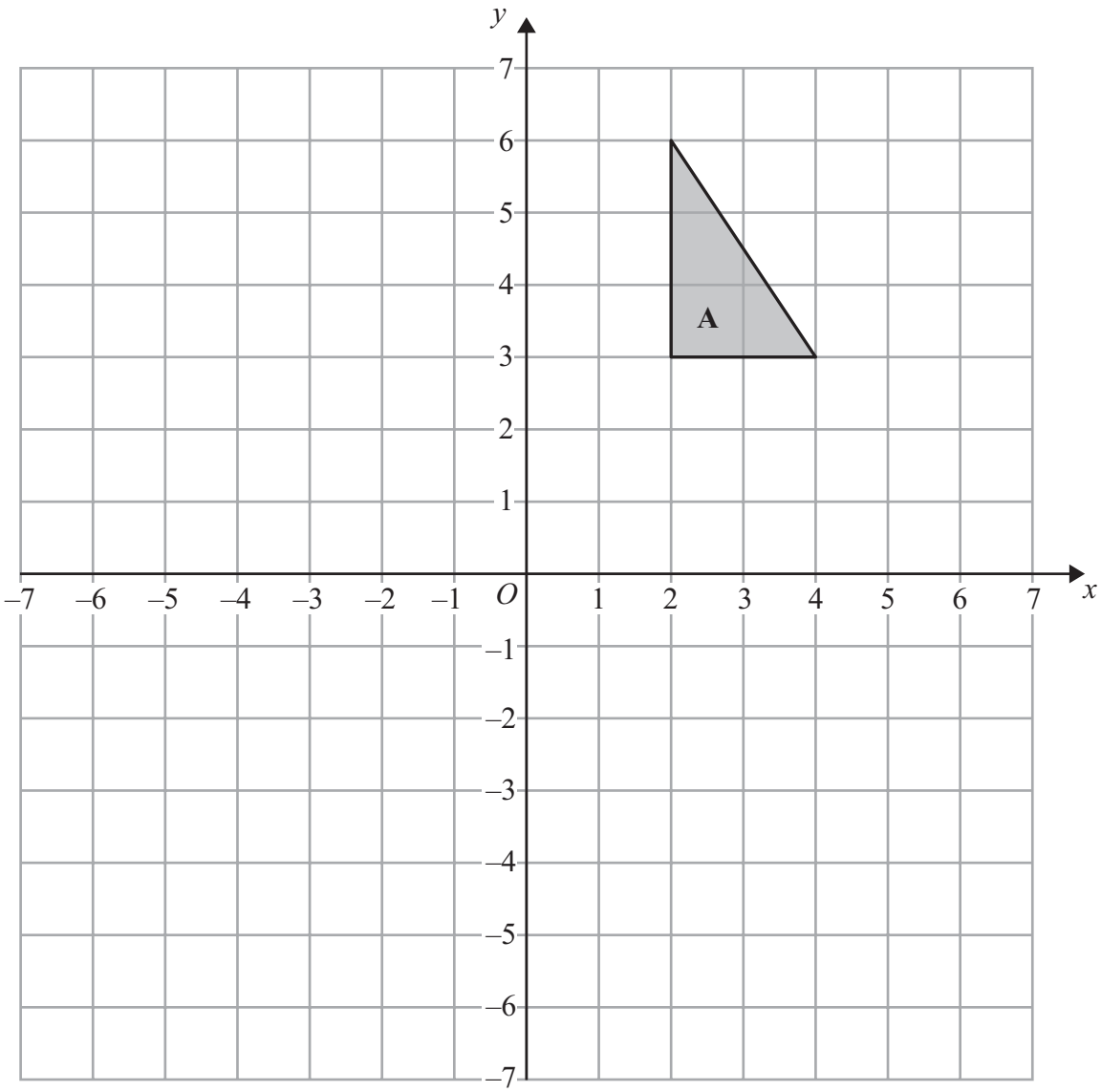
.....

.....

(2)

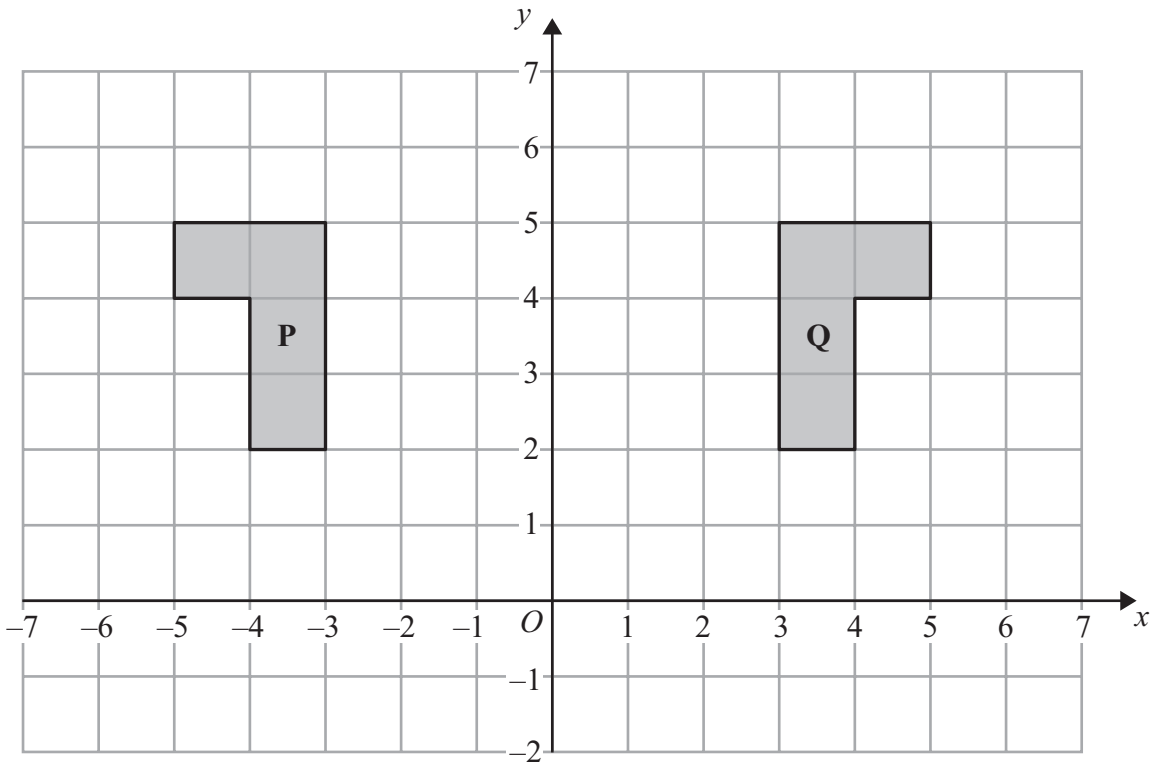


(b) Rotate triangle **A** 90° clockwise about the point (0, 2).
Label the new triangle **B**.

(2)

(Total for Question 1 is 4 marks)

1 Two shapes are shown on the grid.



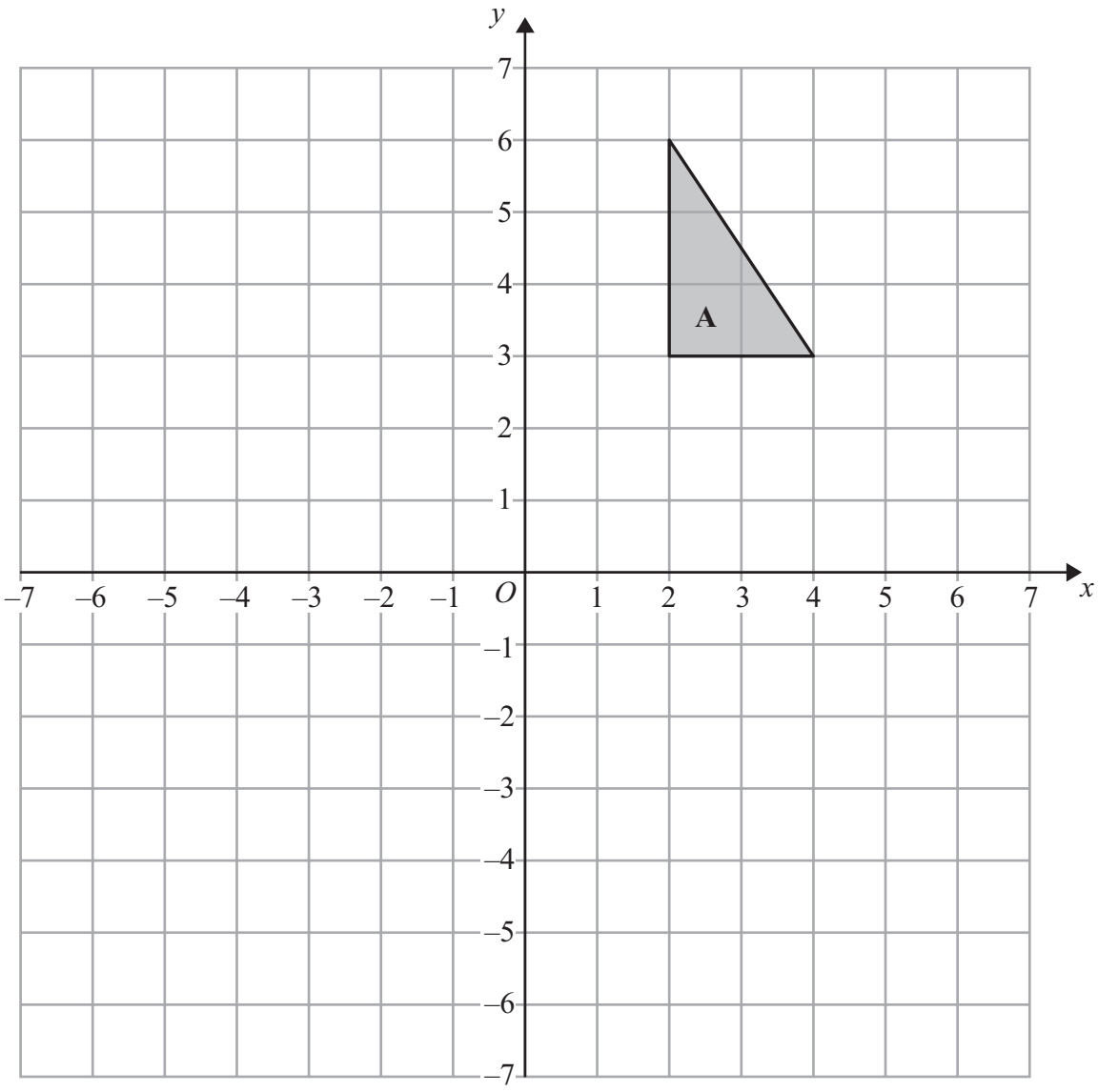
(a) Describe fully the single transformation that maps shape **P** onto shape **Q**.

.....

.....

.....

(2)

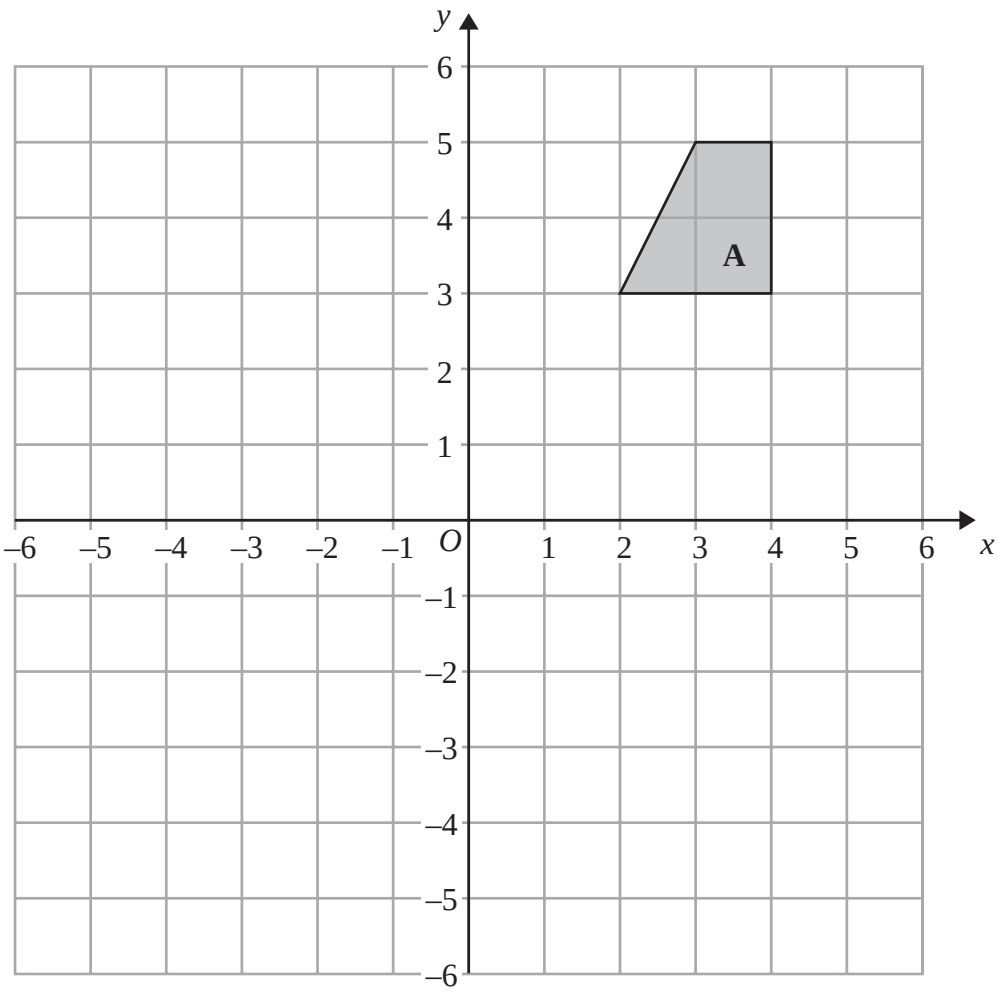


(b) Rotate triangle **A** 90° clockwise about the point (0, 2).
Label the new triangle **B**.

(2)

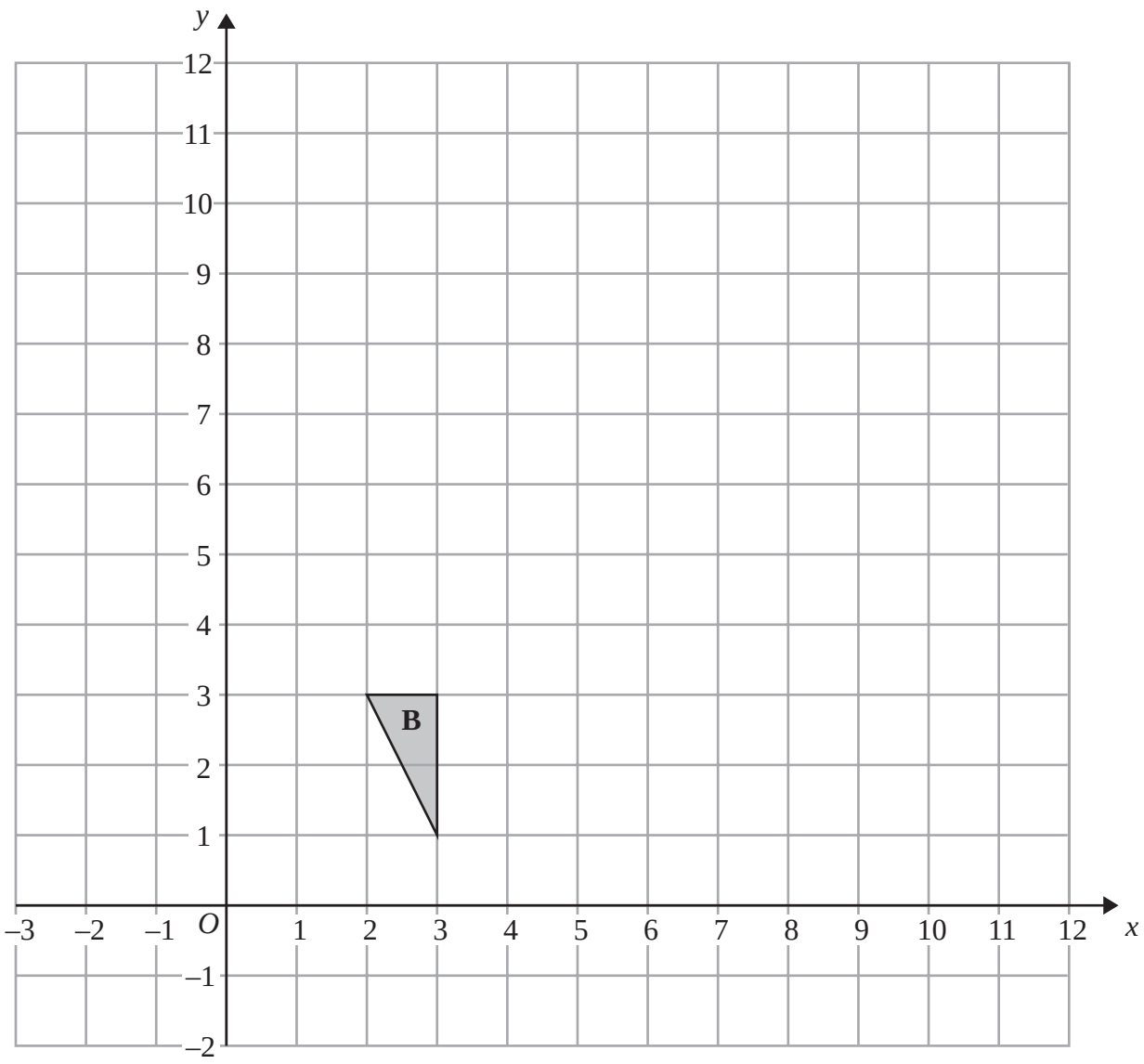
(Total for Question 1 is 4 marks)

9



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

(2)

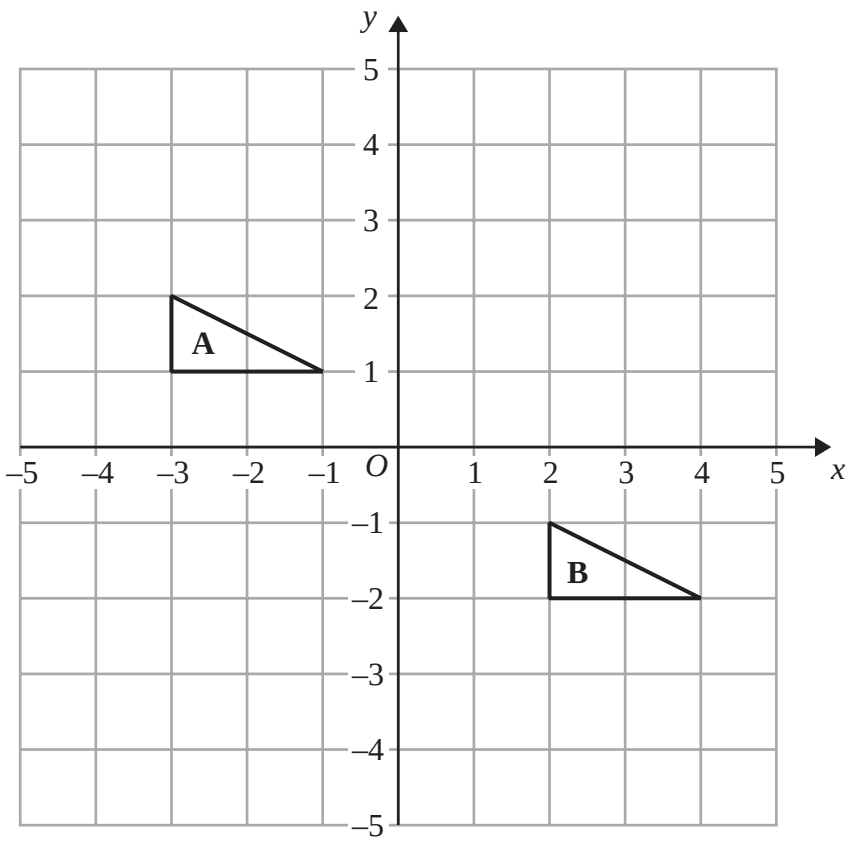


(b) On the grid, enlarge triangle **B** by scale factor 3, centre (0, 0).

(2)

(Total for Question 9 is 4 marks)

5



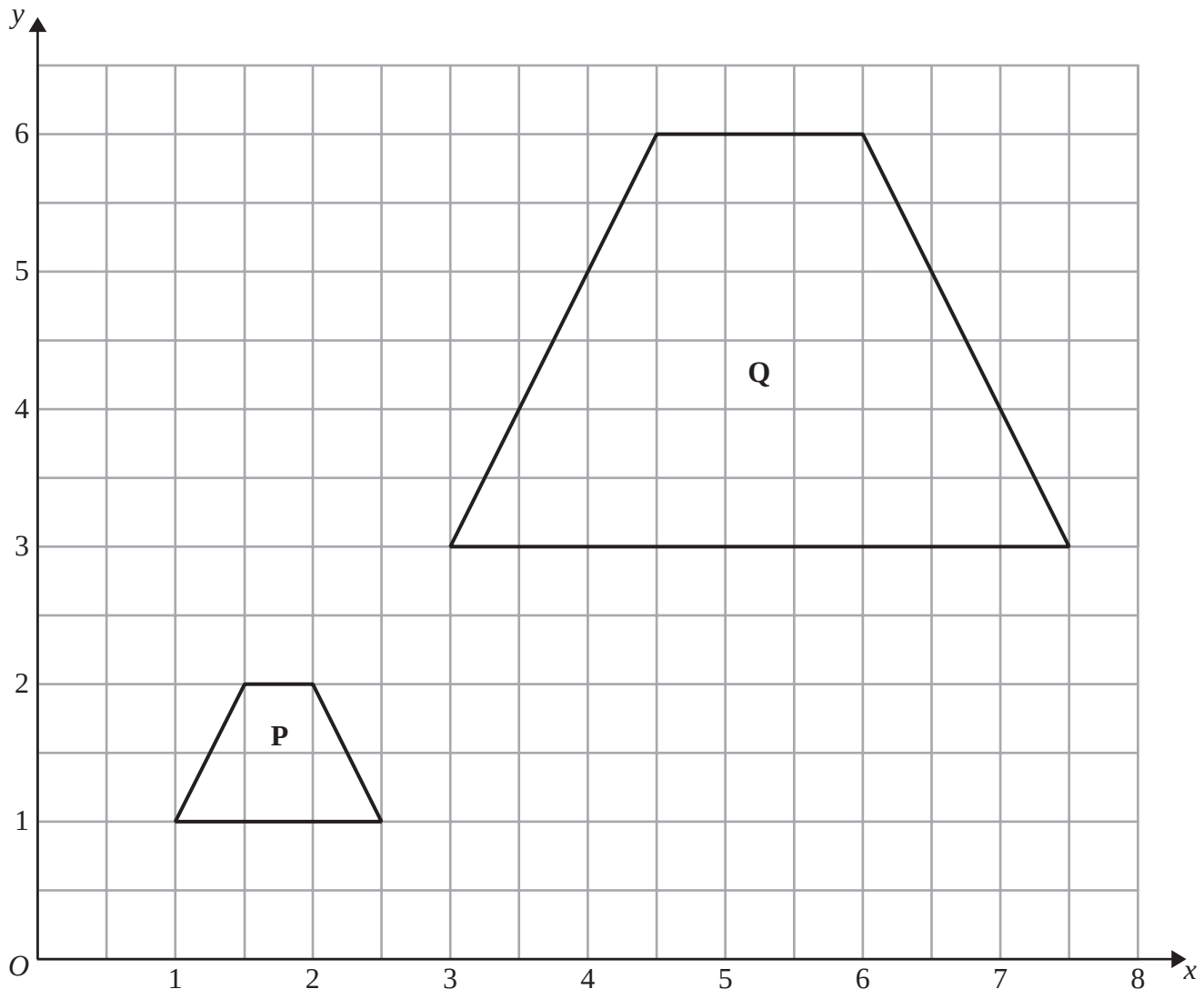
Describe the single transformation that maps triangle **A** onto triangle **B**.

.....

.....

(Total for Question 5 is 2 marks)

3



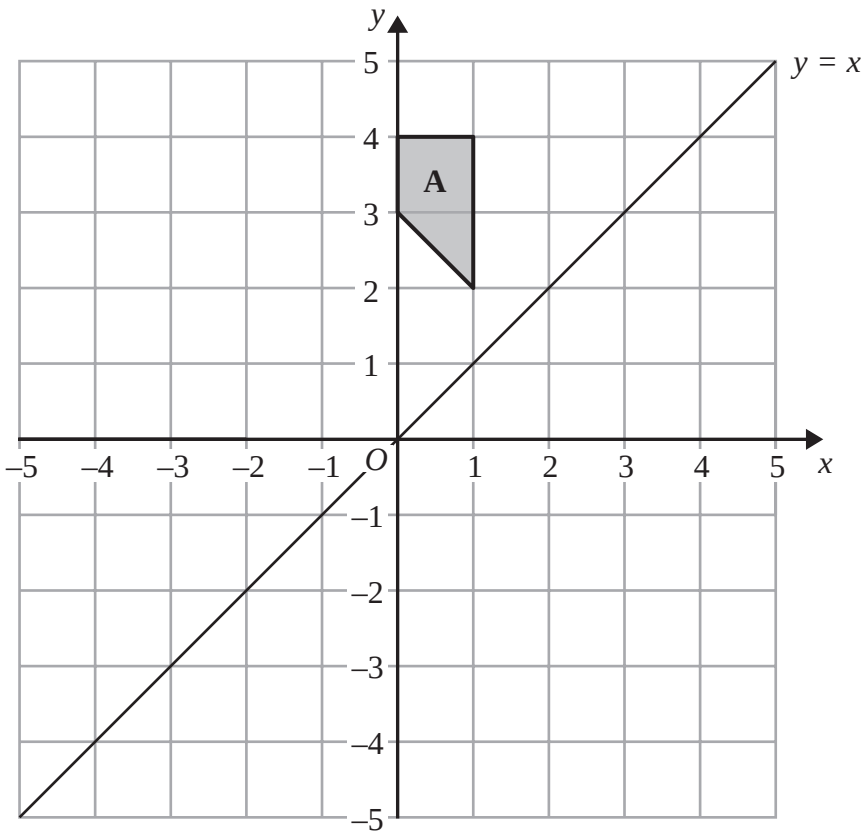
Describe fully the single transformation that maps shape **P** onto shape **Q**.

.....

.....

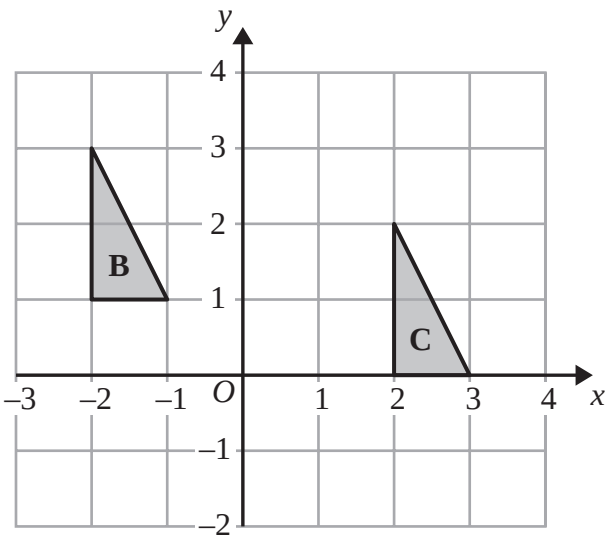
(Total for Question 3 is 3 marks)

4



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

(2)



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

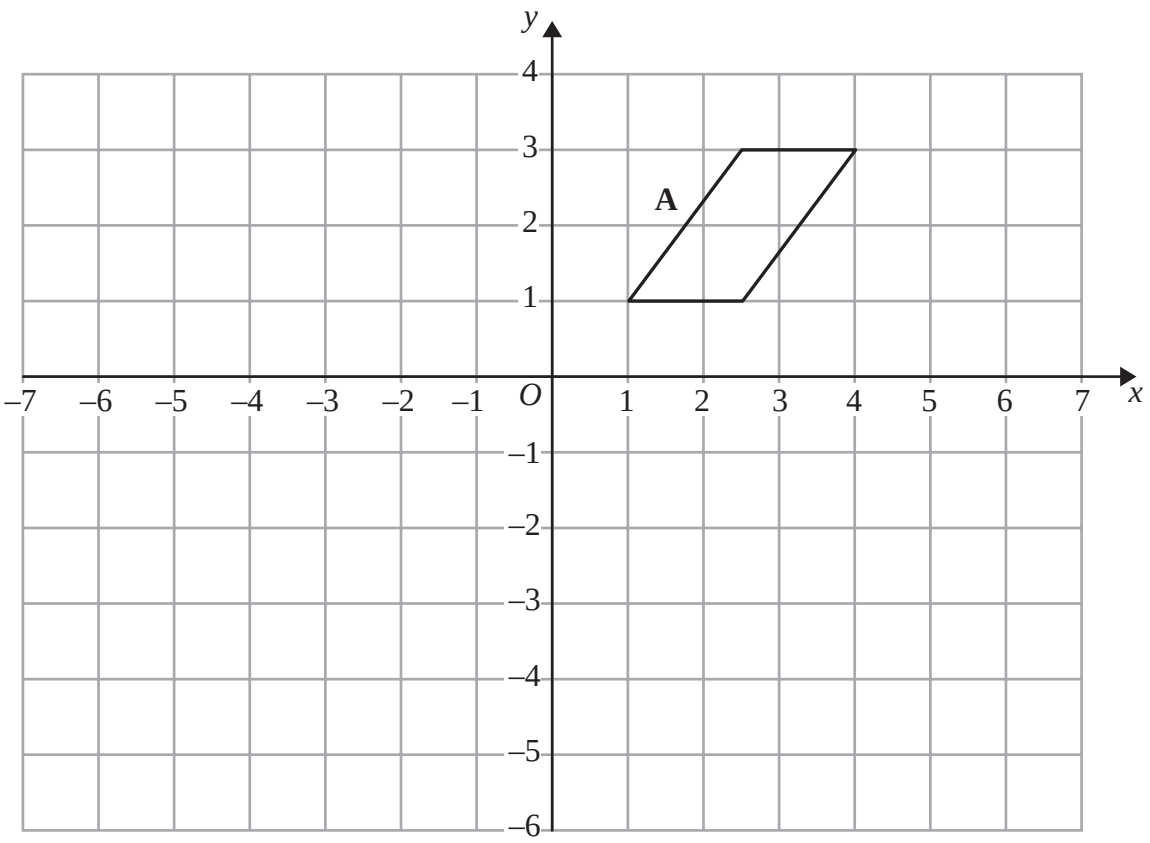
.....

.....

(2)

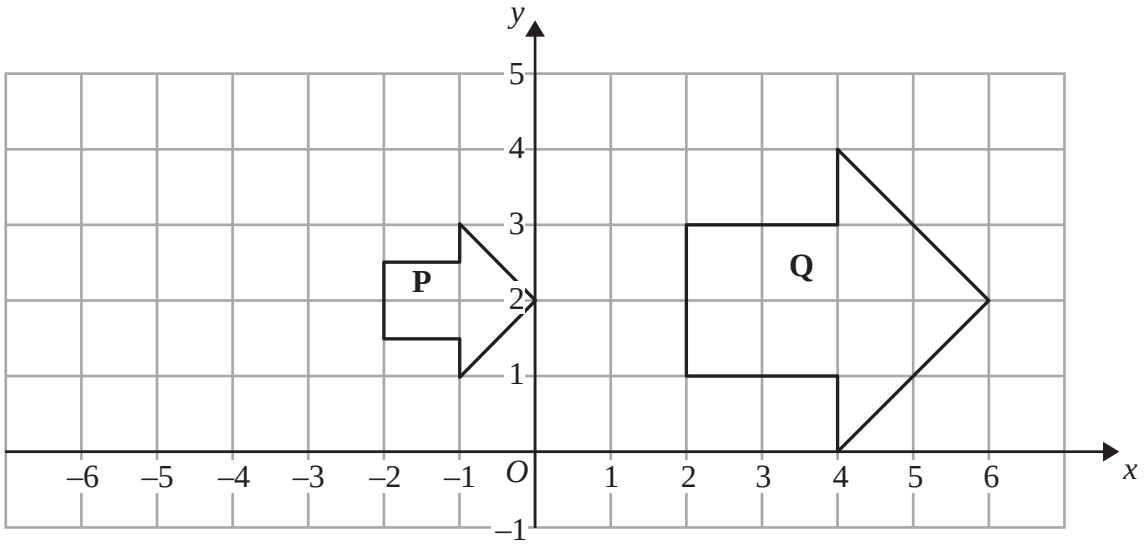
(Total for Question 4 is 4 marks)

7



(a) Reflect shape **A** in the line $x = -1$

(2)



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

.....

.....

(3)

(Total for Question 7 is 5 marks)

10 The diagram shows a trundle wheel.

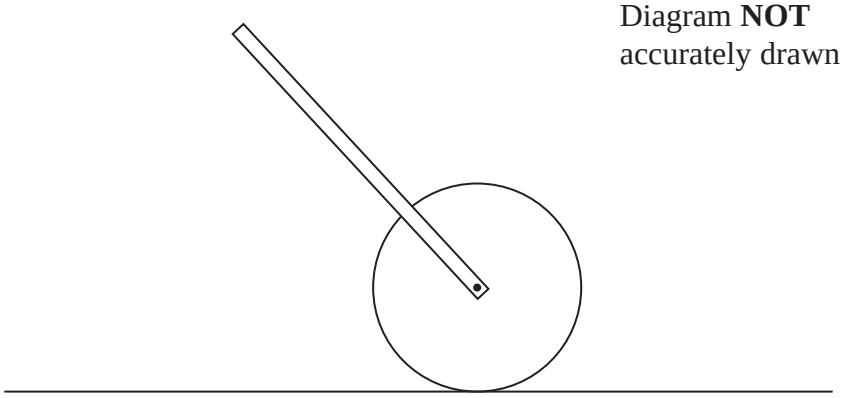


Diagram **NOT** accurately drawn

Trundle wheels are used to measure distances along the ground.

The radius of the trundle wheel is 20 cm.

Jim wants to work out the distance between two junctions on a road.
He rolls the trundle wheel between the two junctions.

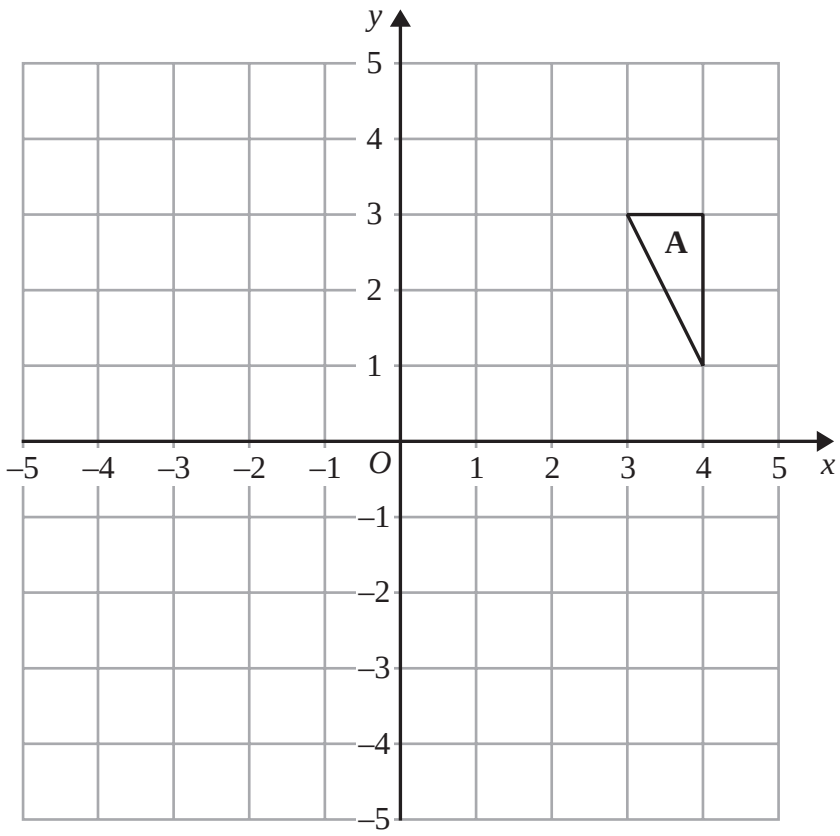
The trundle wheel rotates exactly 34 times.

Work out the distance between the two junctions.
Give your answer in metres correct to the nearest metre.

.....m

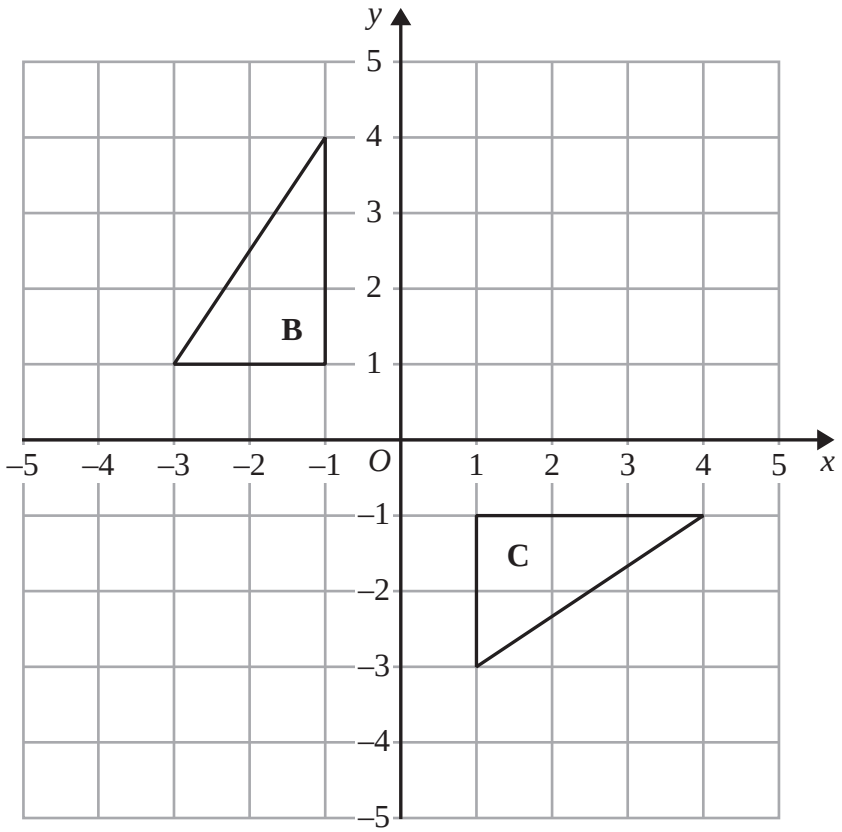
(Total for Question 10 is 3 marks)

7



(a) Rotate triangle **A** 90° anticlockwise with centre O.

(2)



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

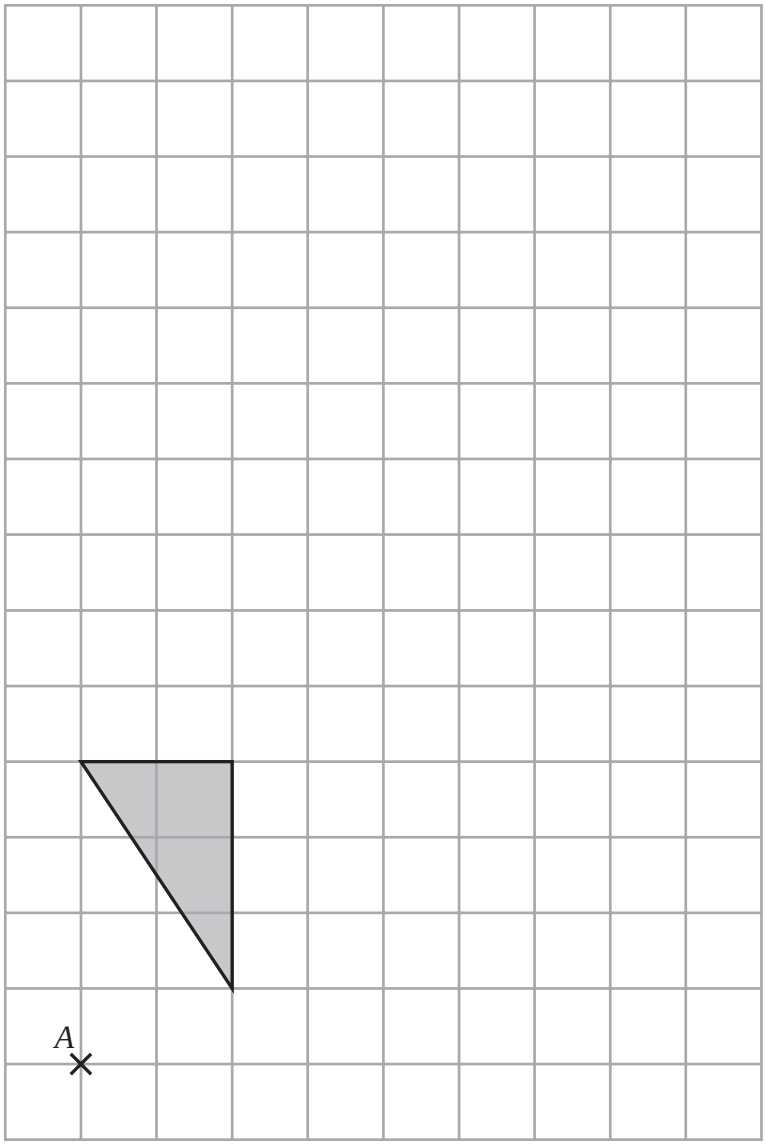
.....

.....

(2)

(Total for Question 7 is 4 marks)

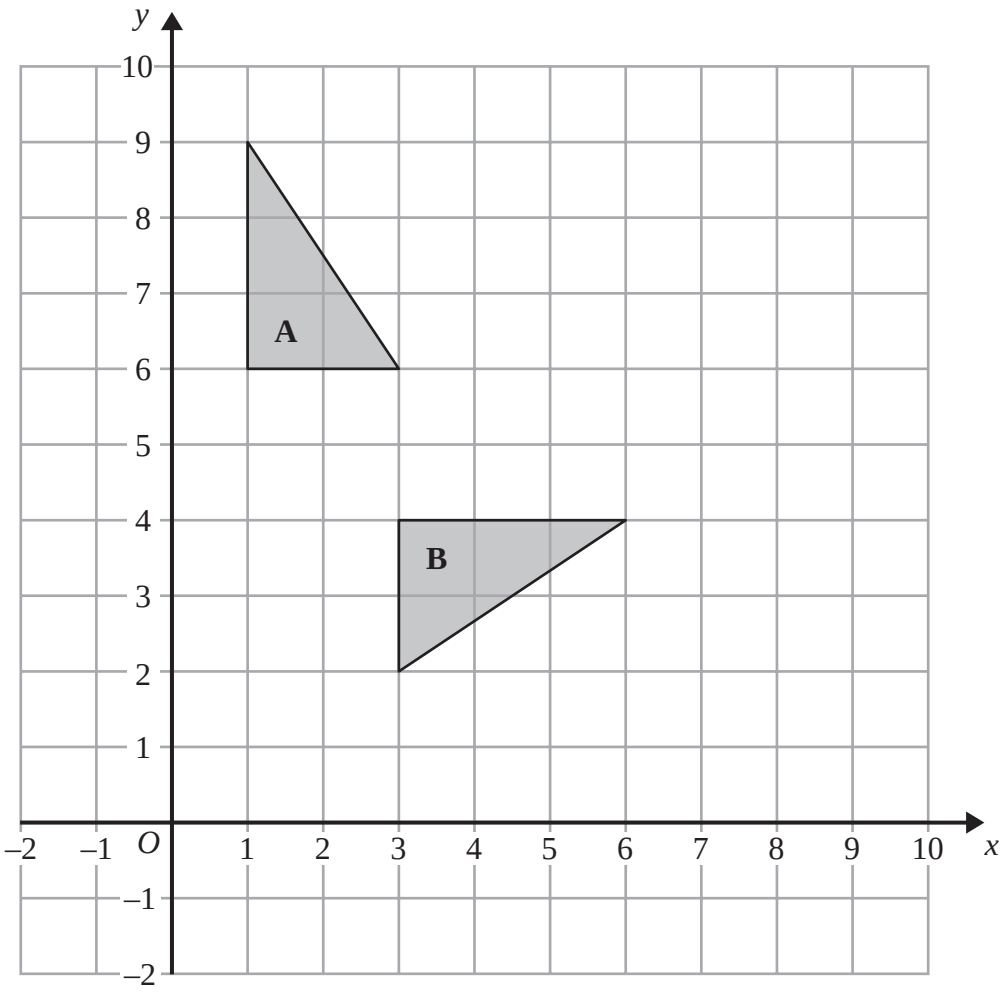
4 A shaded shape is shown on the grid.



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

(Total for Question 4 is 2 marks)

10



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

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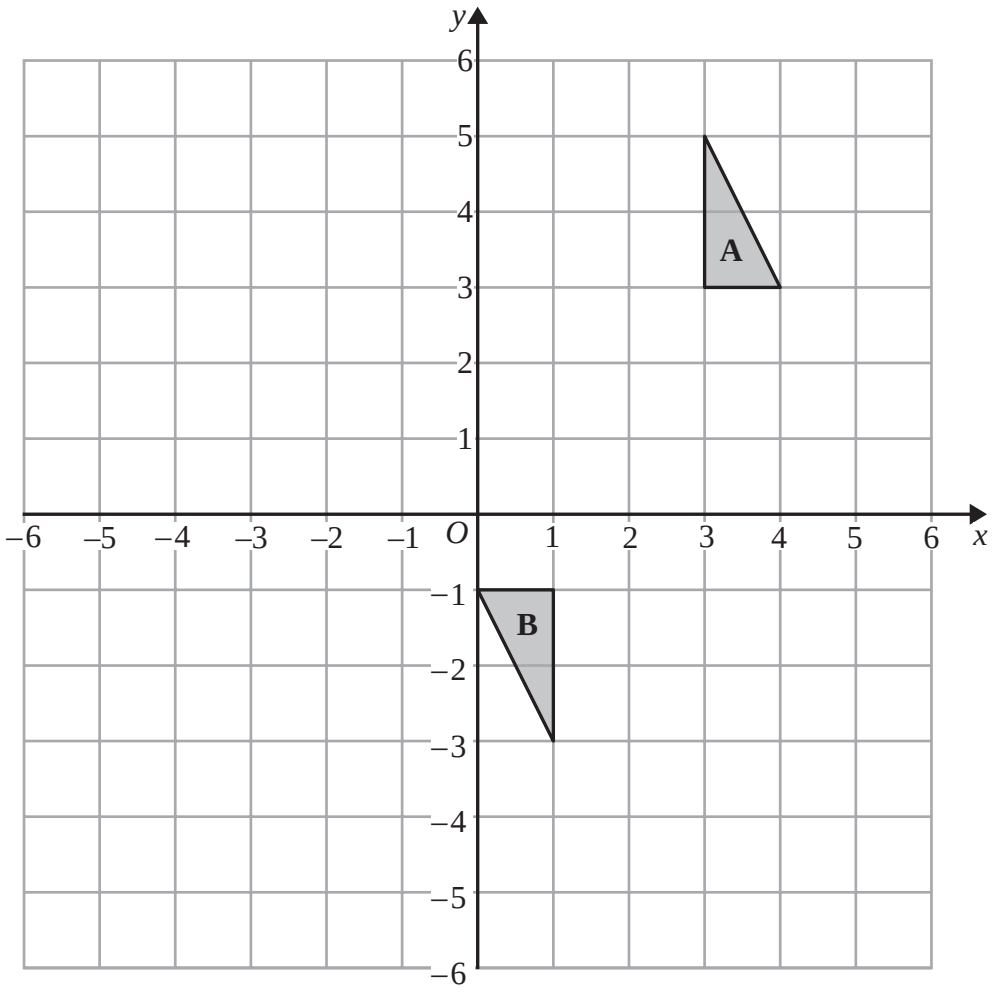
(Total for Question 10 is 3 marks)

12



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

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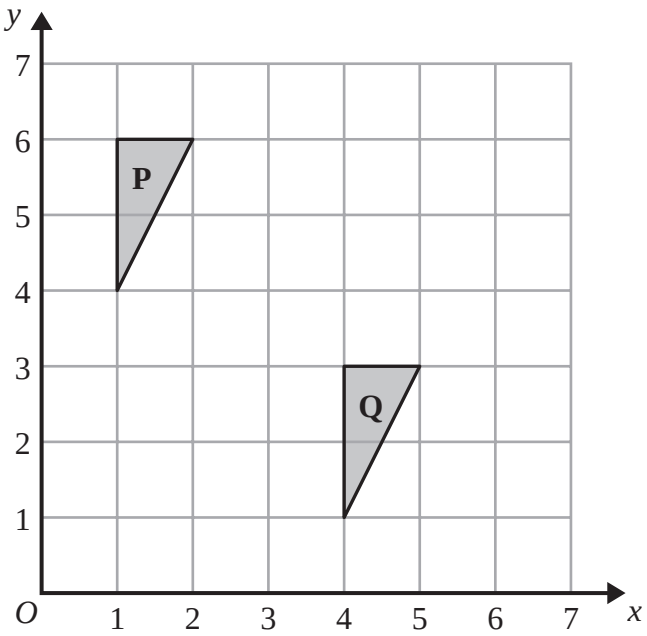
.....

(Total for Question 12 is 3 marks)

4

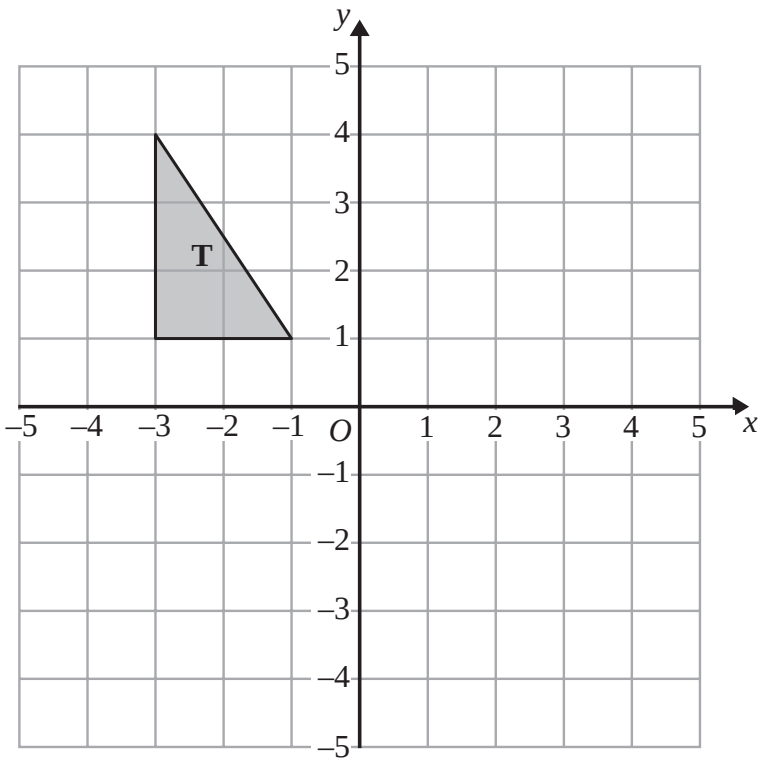


(a) Describe fully the single transformation that maps shape **P** to shape **Q**.

.....

.....

(2)

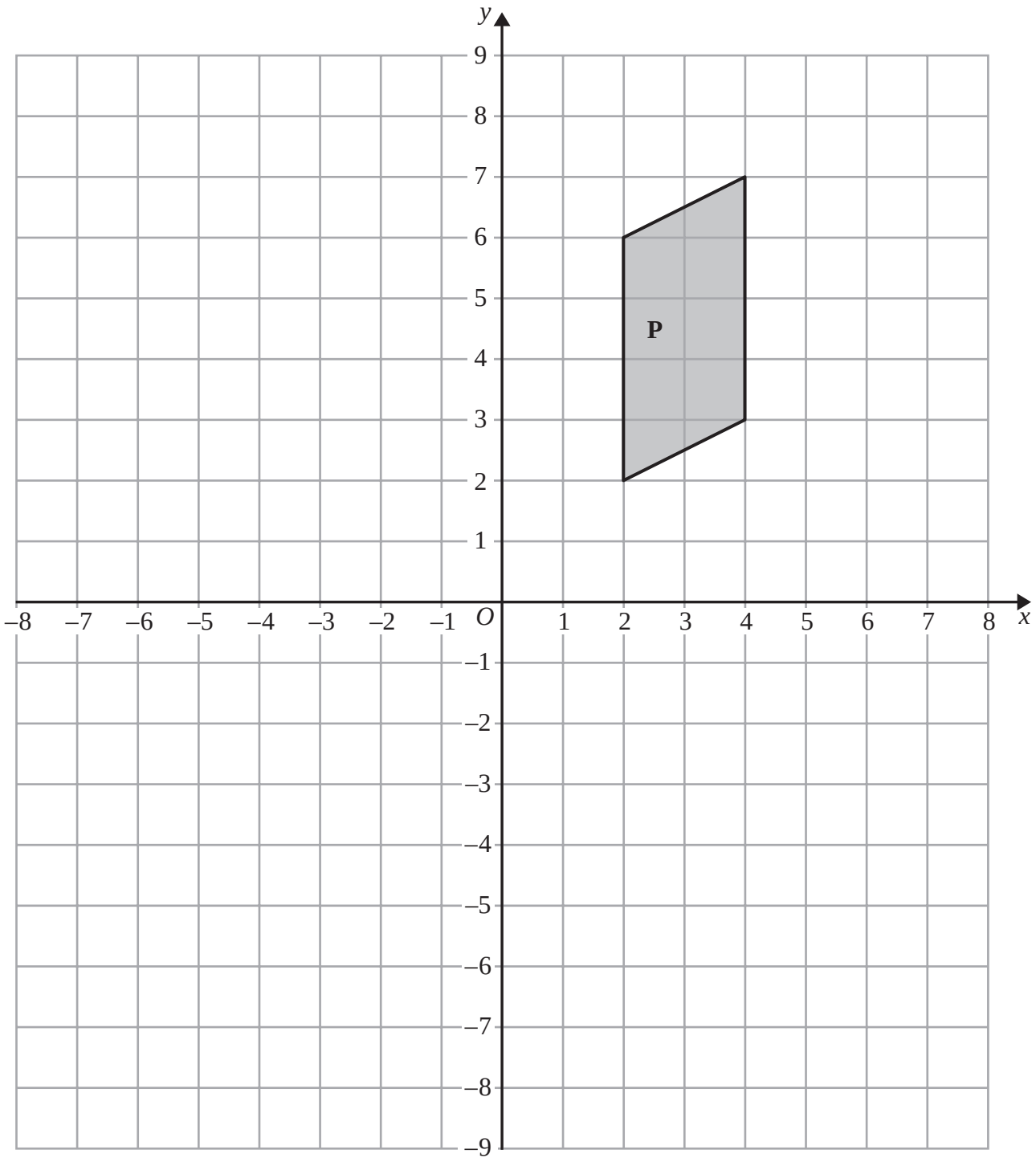


(b) Rotate triangle **T** 180° about the point (0, 1).

(2)

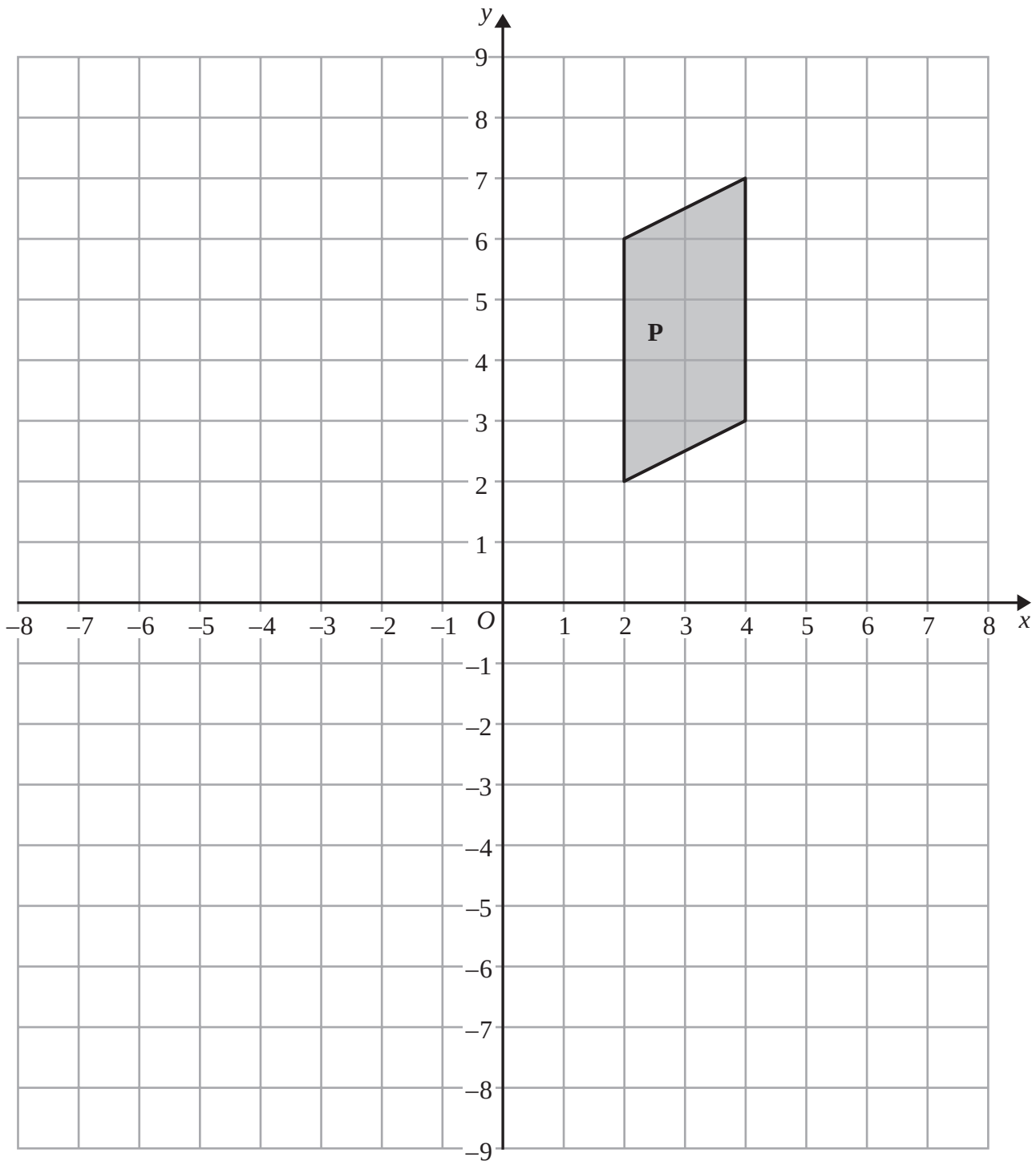
(Total for Question 4 is 4 marks)

2



(a) Reflect shape **P** in the line $x = -1$

(2)

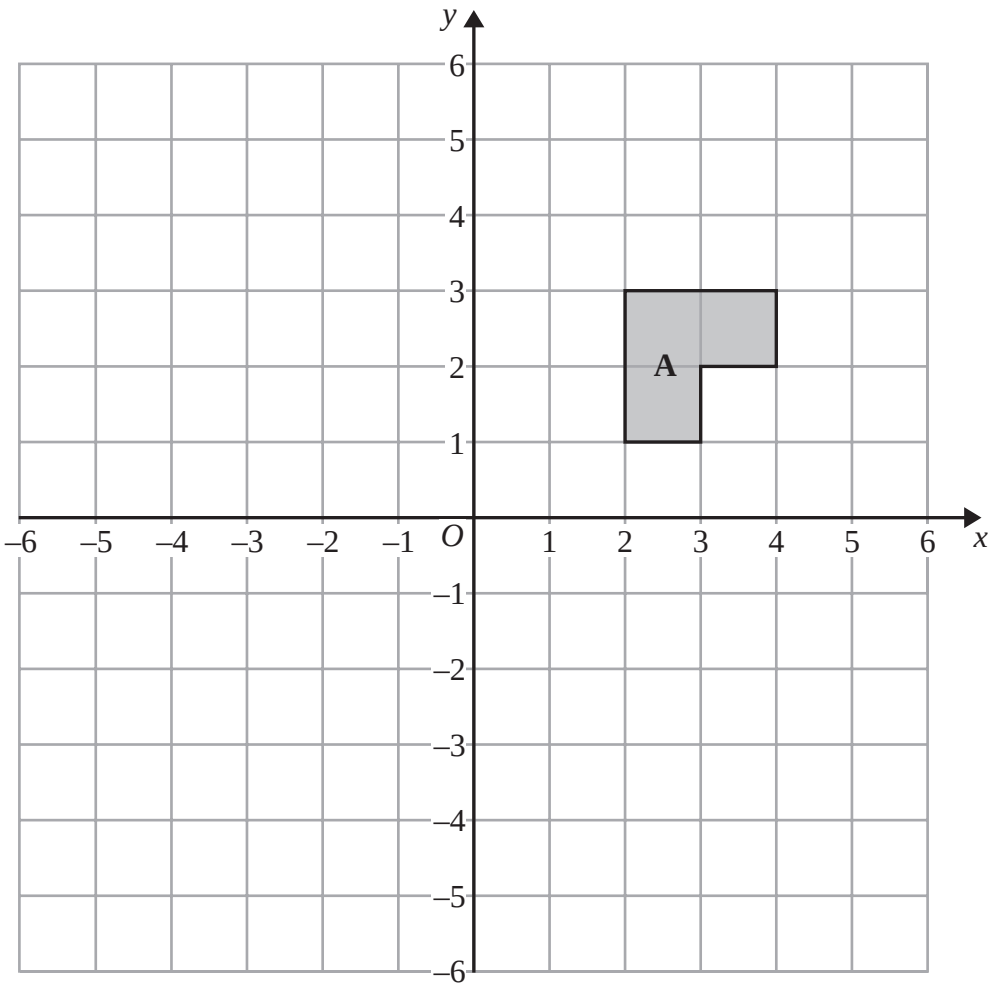


(b) Rotate shape **P** 90° anticlockwise about (0, 1).

(2)

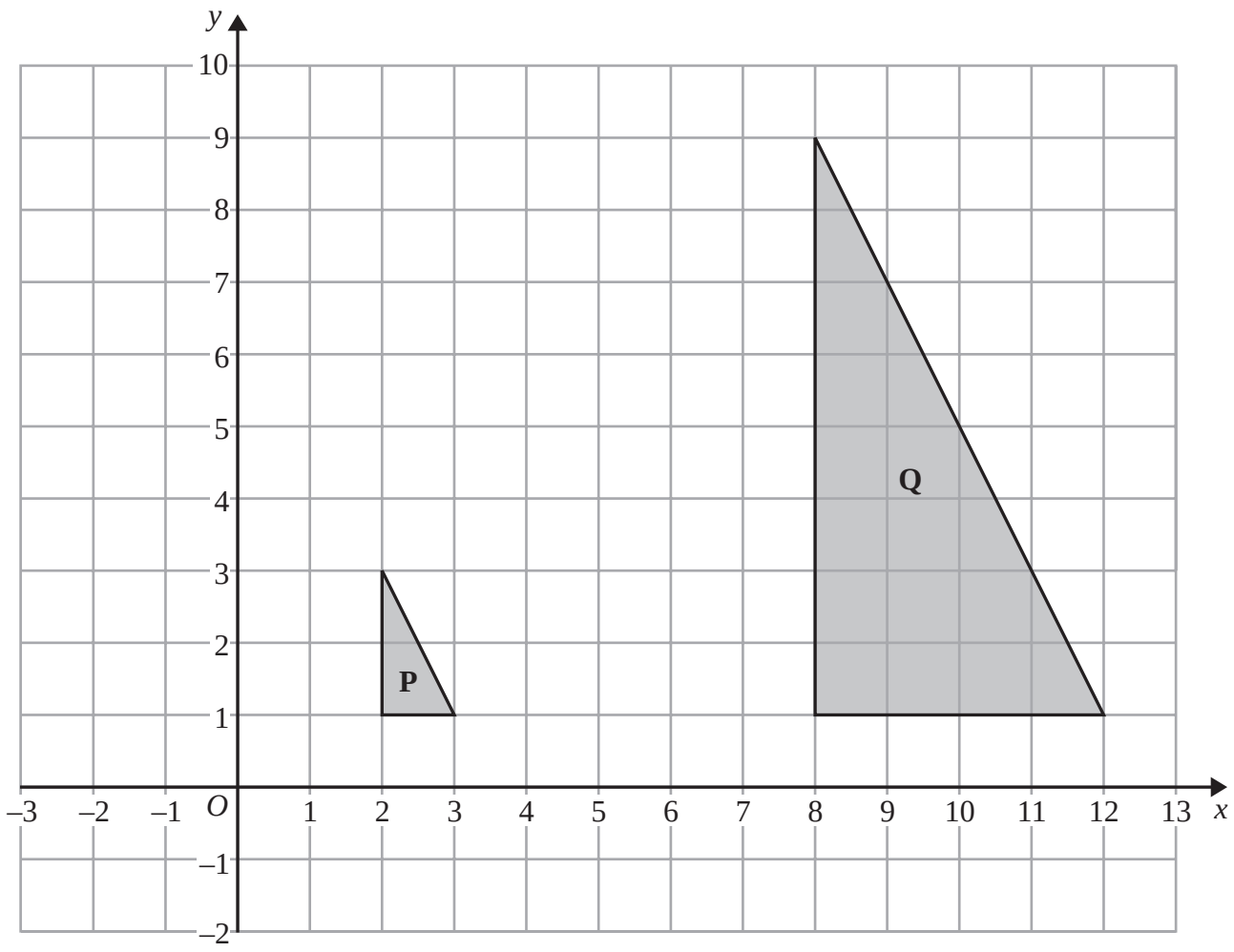
(Total for Question 2 is 4 marks)

2



(a) Rotate shape **A** 180° about the point (0, 0).

(2)



(b) Describe fully the single transformation which maps triangle **P** onto triangle **Q**.

.....

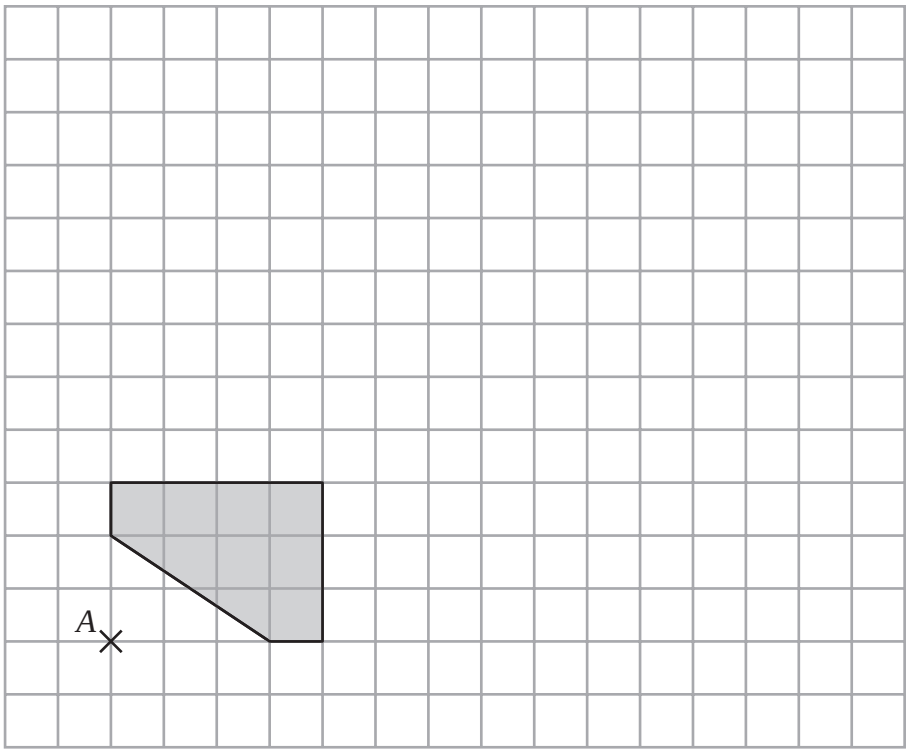
.....

(3)

(Total for Question 2 is 5 marks)

You must NOT use a calculator.

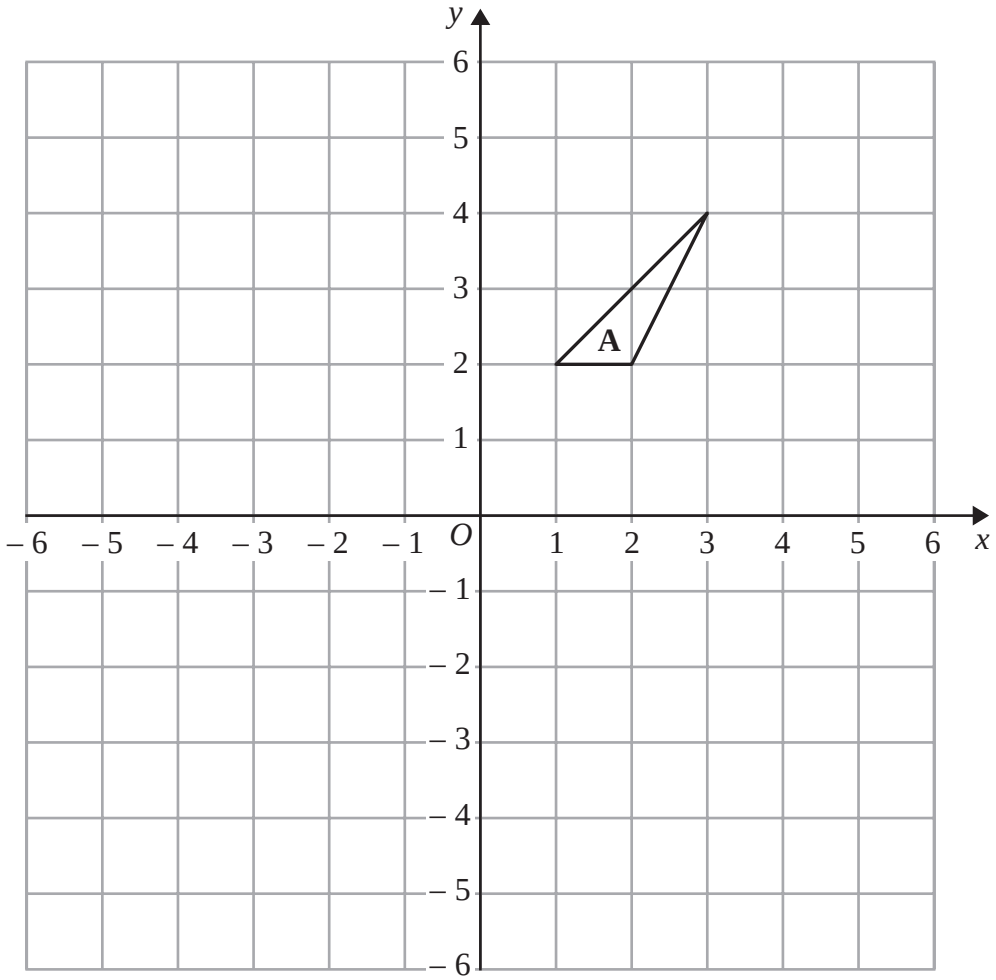
1



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

(Total for Question 1 is 3 marks)

14



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**.

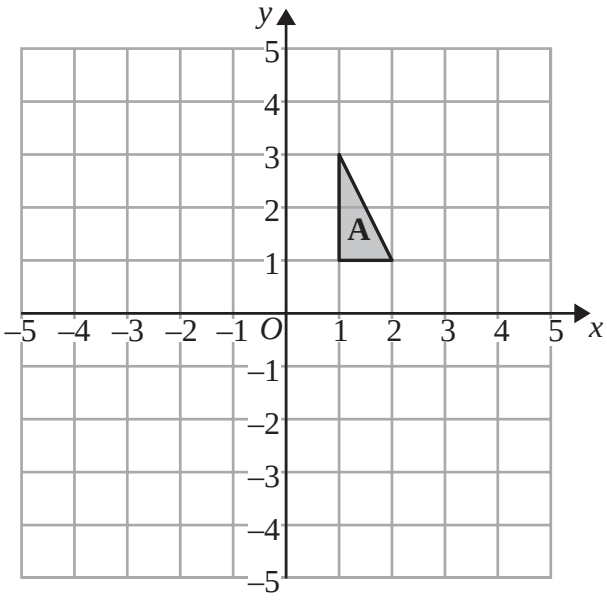
Describe fully the single transformation that maps triangle **A** onto triangle **C**.

.....

.....

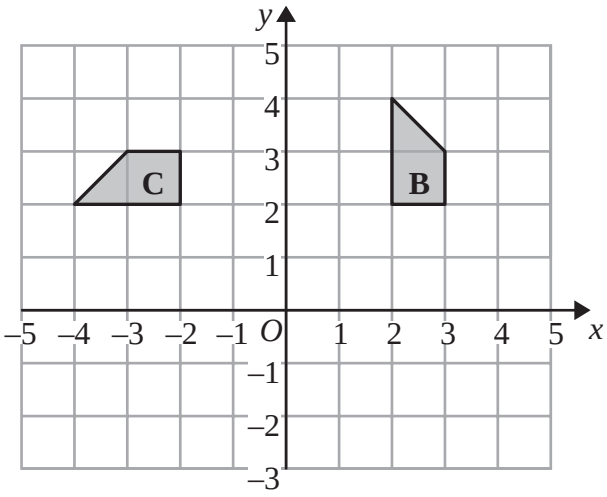
(Total for Question 14 is 3 marks)

6



(a) On the grid above, translate shape **A** by the vector $\begin{pmatrix} -3 \\ -1 \end{pmatrix}$

(2)



(b) Describe fully the single transformation that maps shape **B** onto shape **C**.

.....

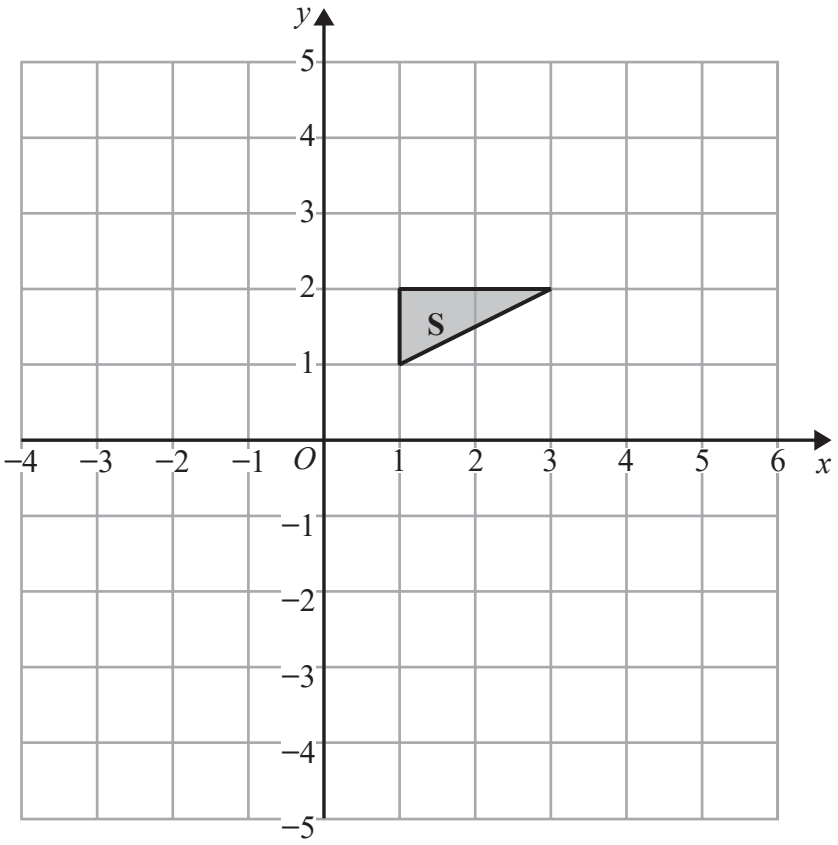
.....

.....

(3)

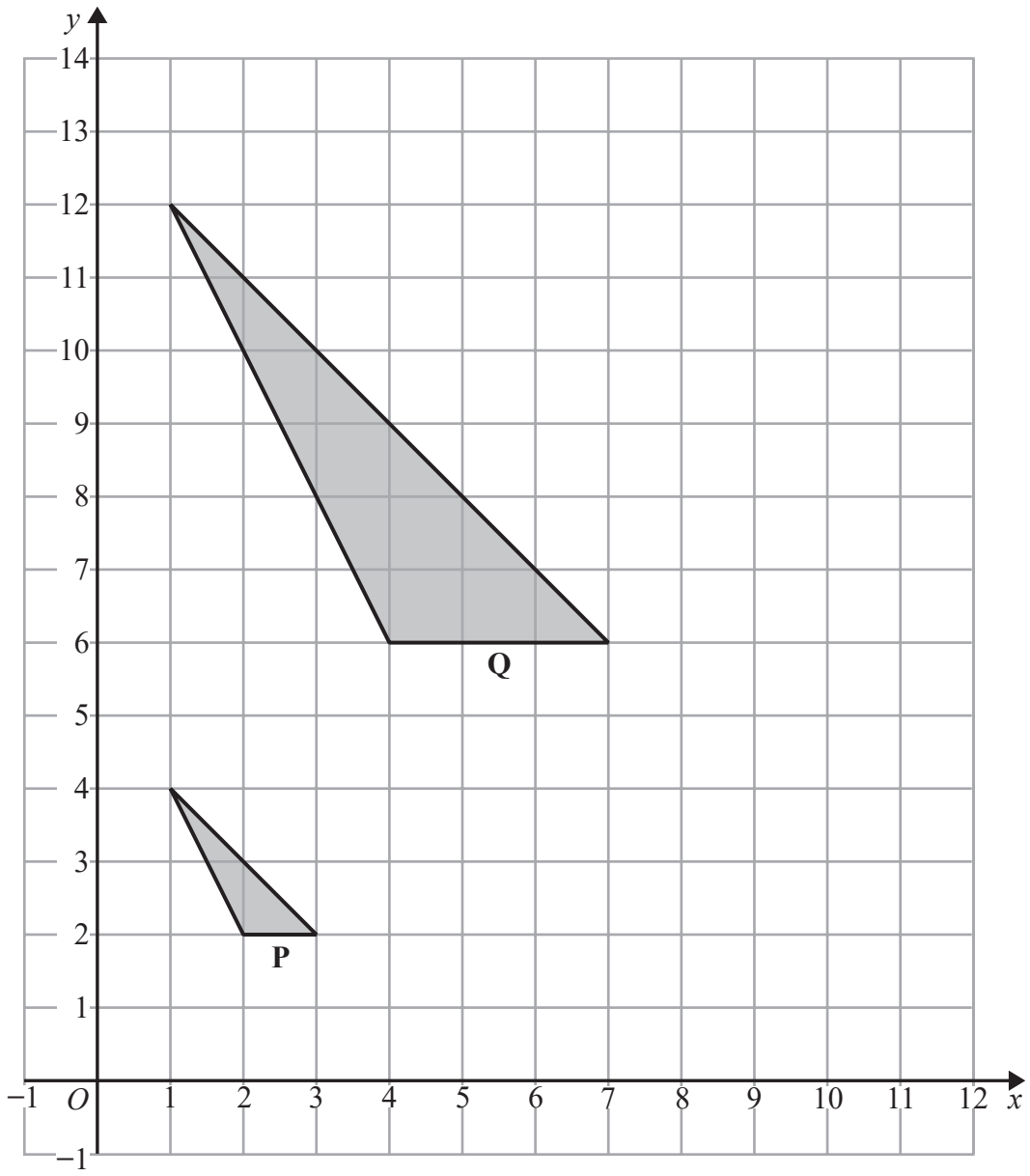
(Total for Question 6 is 5 marks)

8



(a) On the grid, rotate shape **S** by 90° anticlockwise about the origin.

(2)



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

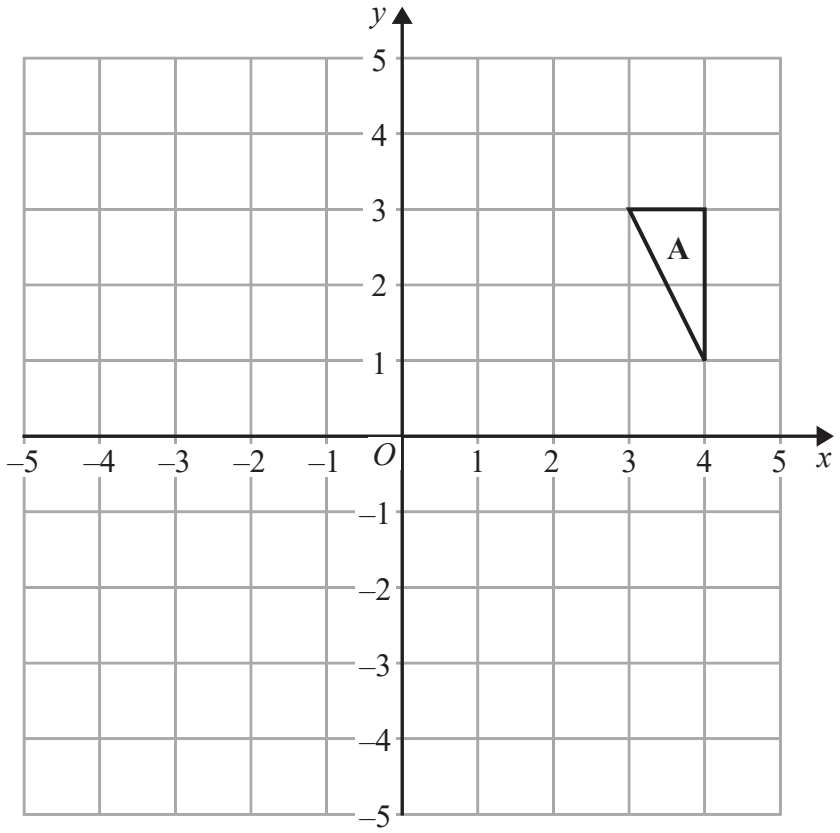
.....

.....

(3)

(Total for Question 8 is 5 marks)

9 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.

(Total for Question 9 is 3 marks)

20 The equation of a curve is $y = a^x$
A is the point where the curve intersects the y-axis.

(a) State the coordinates of A.

(..... , ...)
(1)

The equation of circle **C** is $x^2 + y^2 = 16$

The circle **C** is translated by the vector $\begin{pmatrix} 3 \\ 0 \end{pmatrix}$ to give circle **B**.

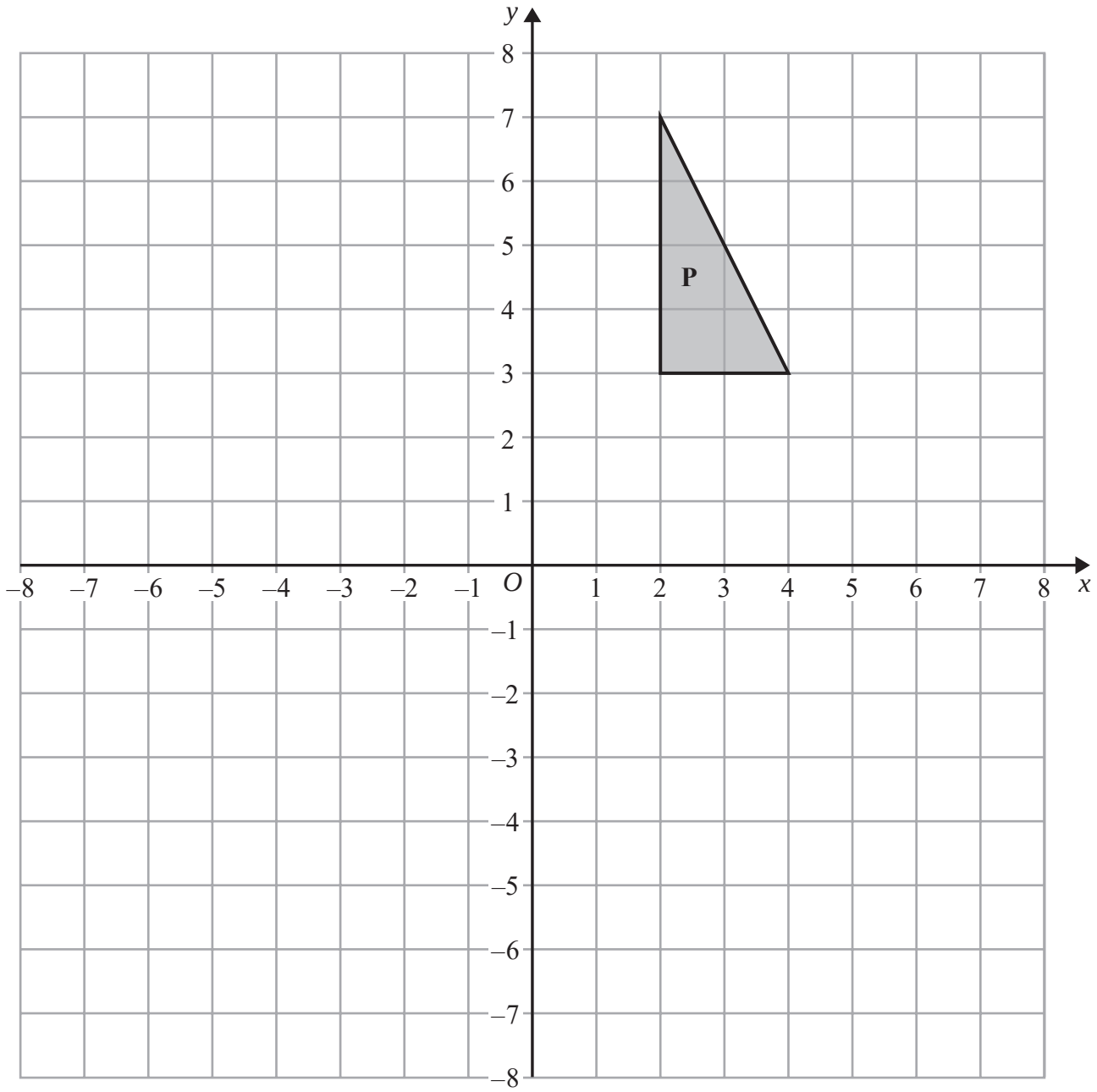
(b) Draw a sketch of circle **B**.

Label with coordinates
the centre of circle **B**
and any points of intersection with the x-axis.

(3)

(Total for Question 20 is 4 marks)

18

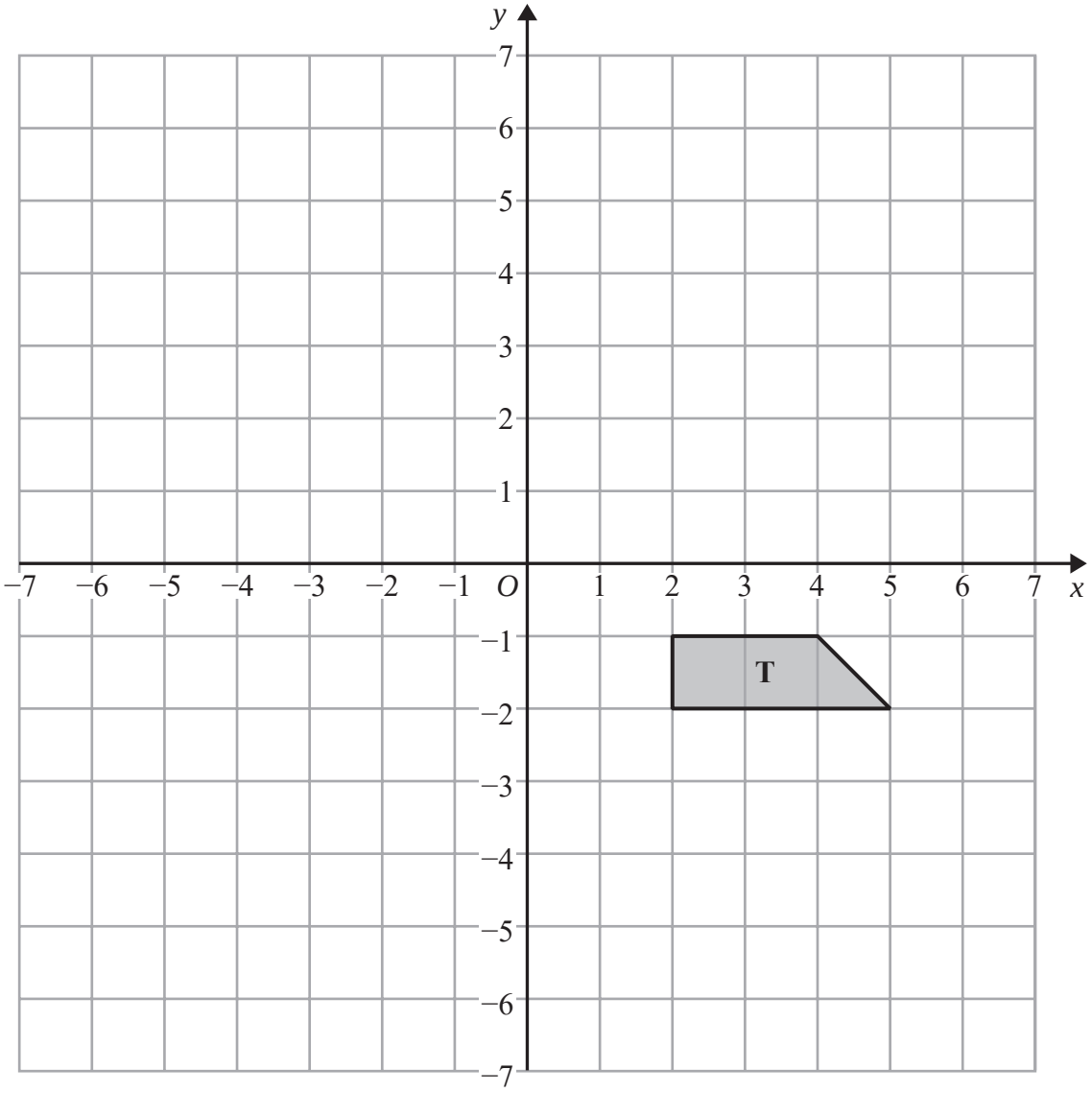


Enlarge shape **P** by scale factor $-\frac{1}{2}$ with centre of enlargement (0, 0).

Label your image **Q**.

(Total for Question 18 is 2 marks)

5



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

(1)

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

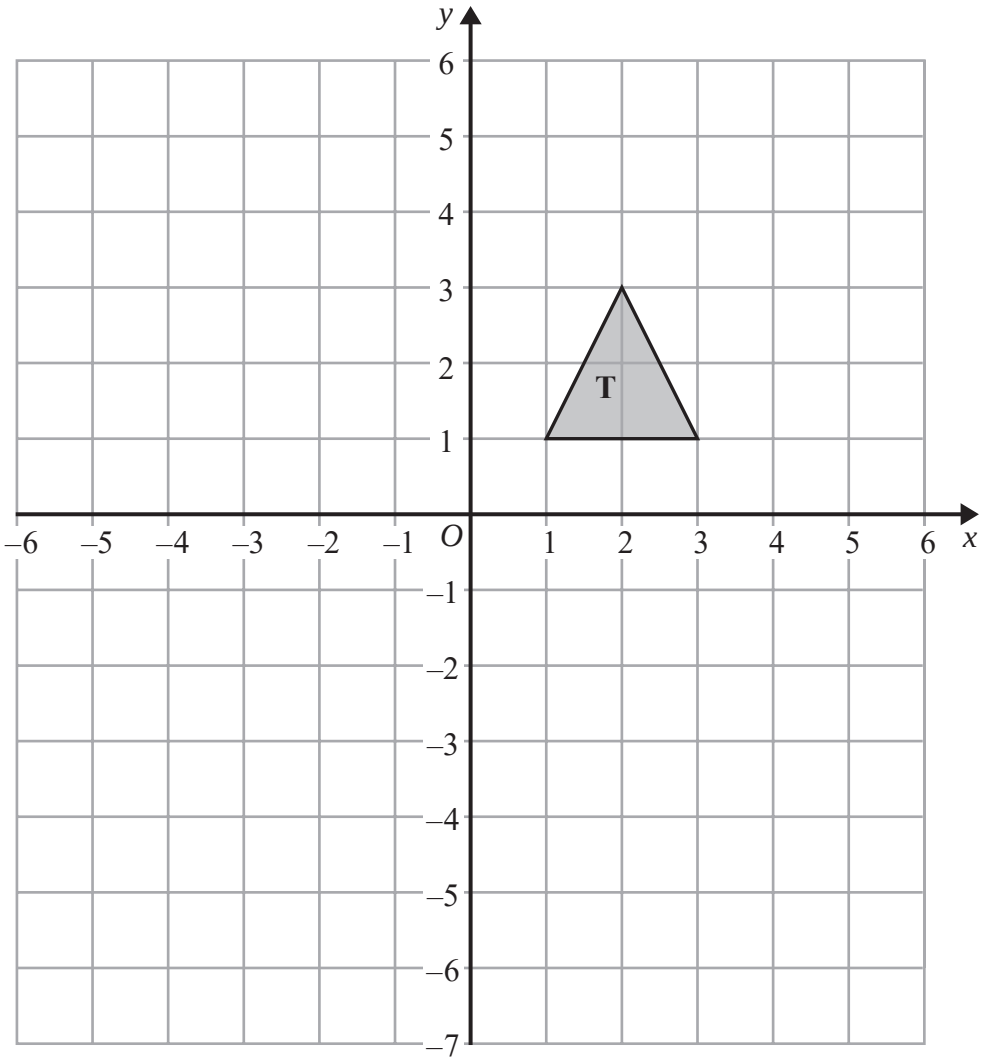
(1)

(Total for Question 5 is 2 marks)

Question 58

June 2018 | 1MA1/1H | Original Q7

7



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**.

.....

.....

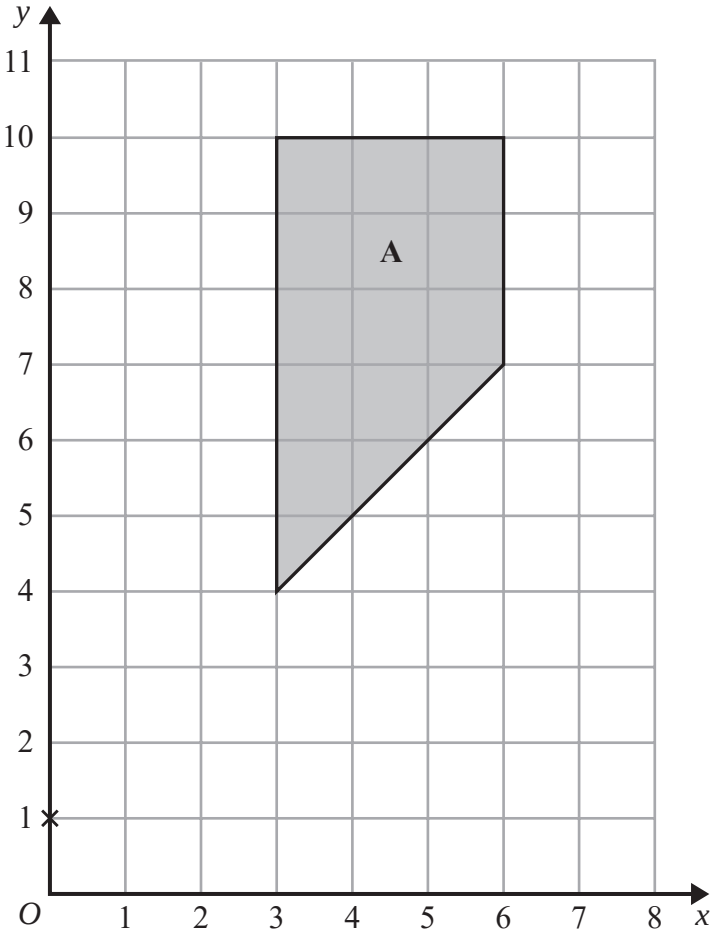
.....

(Total for Question 7 is 2 marks)

Question 59

June 2018 | 1MA1/2H | Original Q7

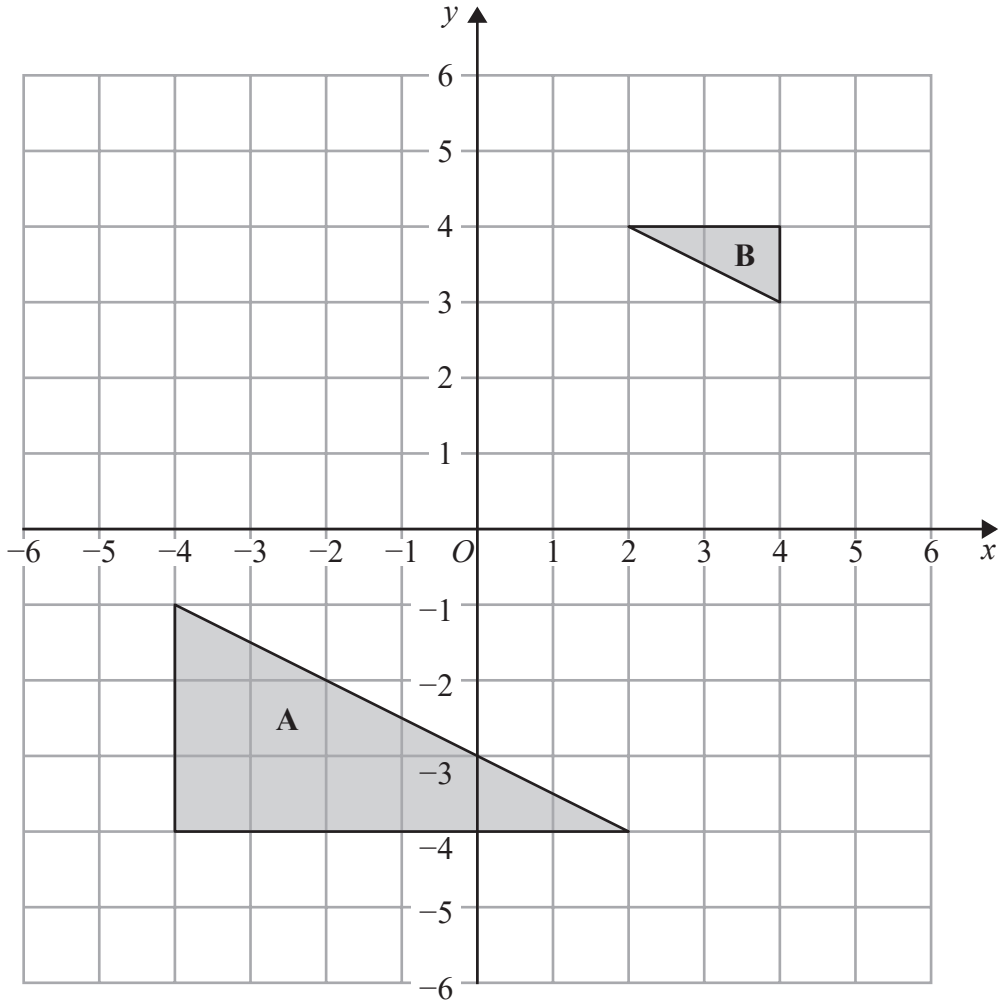
7



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

(Total for Question 7 is 2 marks)

13

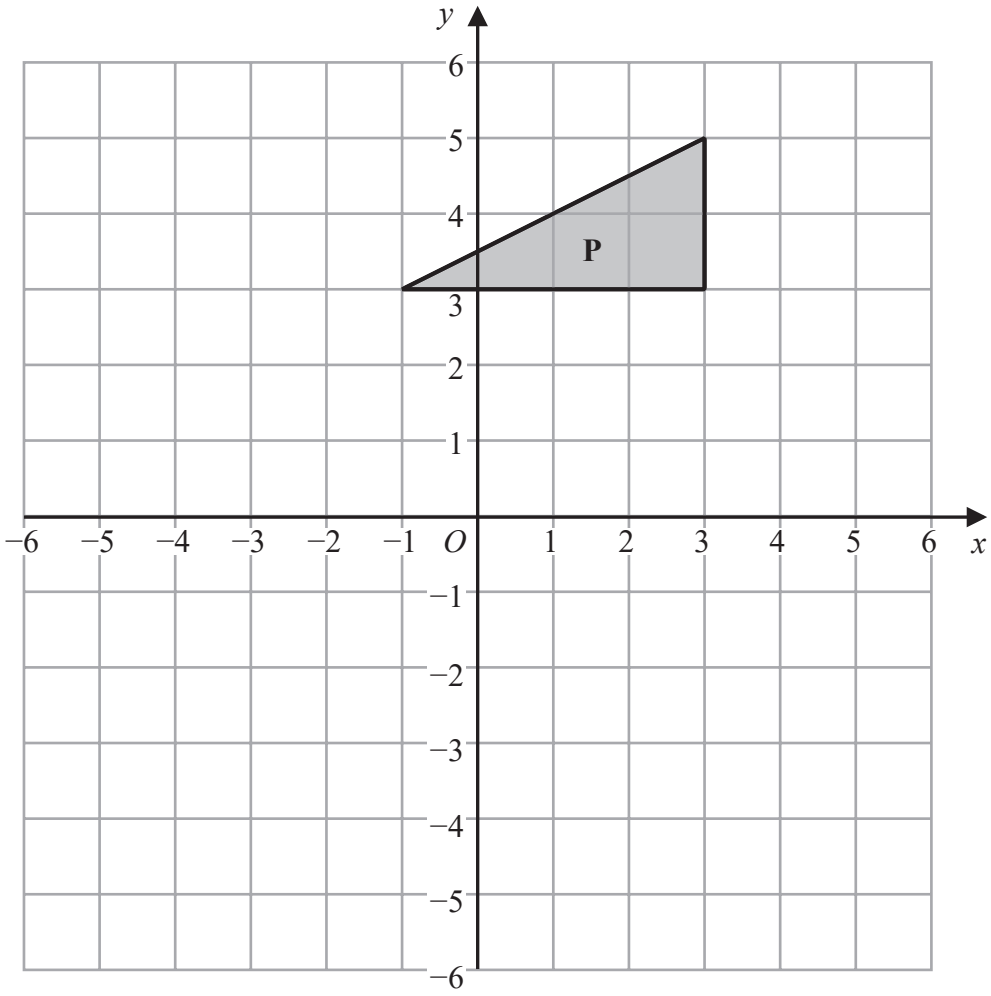


Describe fully the single transformation that maps triangle **A** onto triangle **B**.

.....

(Total for Question 13 is 2 marks)

8



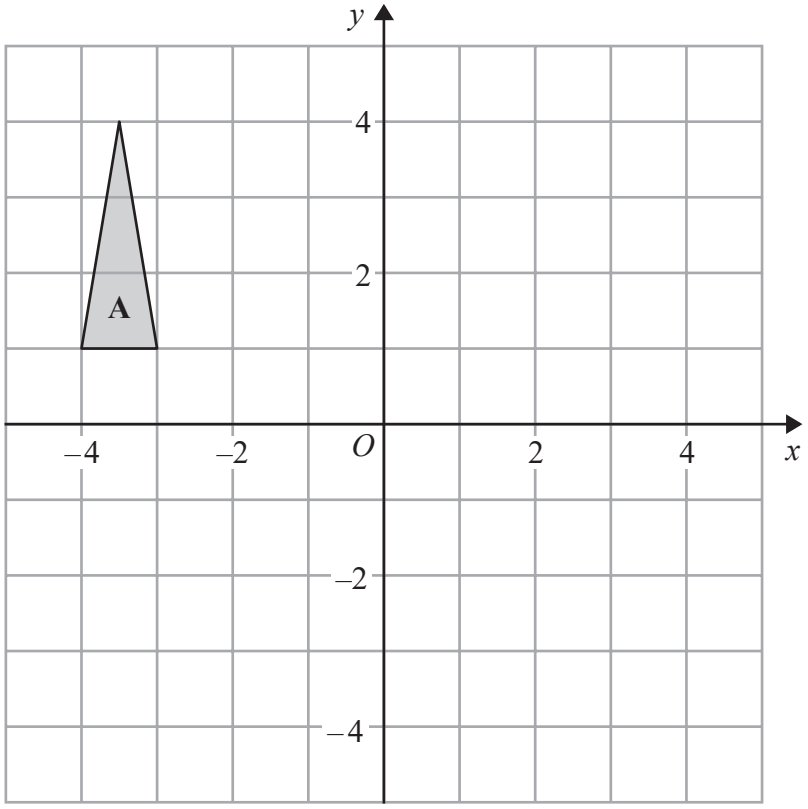
Triangle **P** is reflected in the line $y = -x$ to give triangle **Q**.
Triangle **Q** is reflected in the line $x = -1$ to give triangle **R**.

Describe fully the single transformation that maps triangle **R** to triangle **P**.

.....

(Total for Question 8 is 3 marks)

20



Triangle **A** is transformed by the combined transformation of a rotation of 180° about the point (−2, 0) followed by a translation with vector $\begin{pmatrix} -3 \\ 2 \end{pmatrix}$

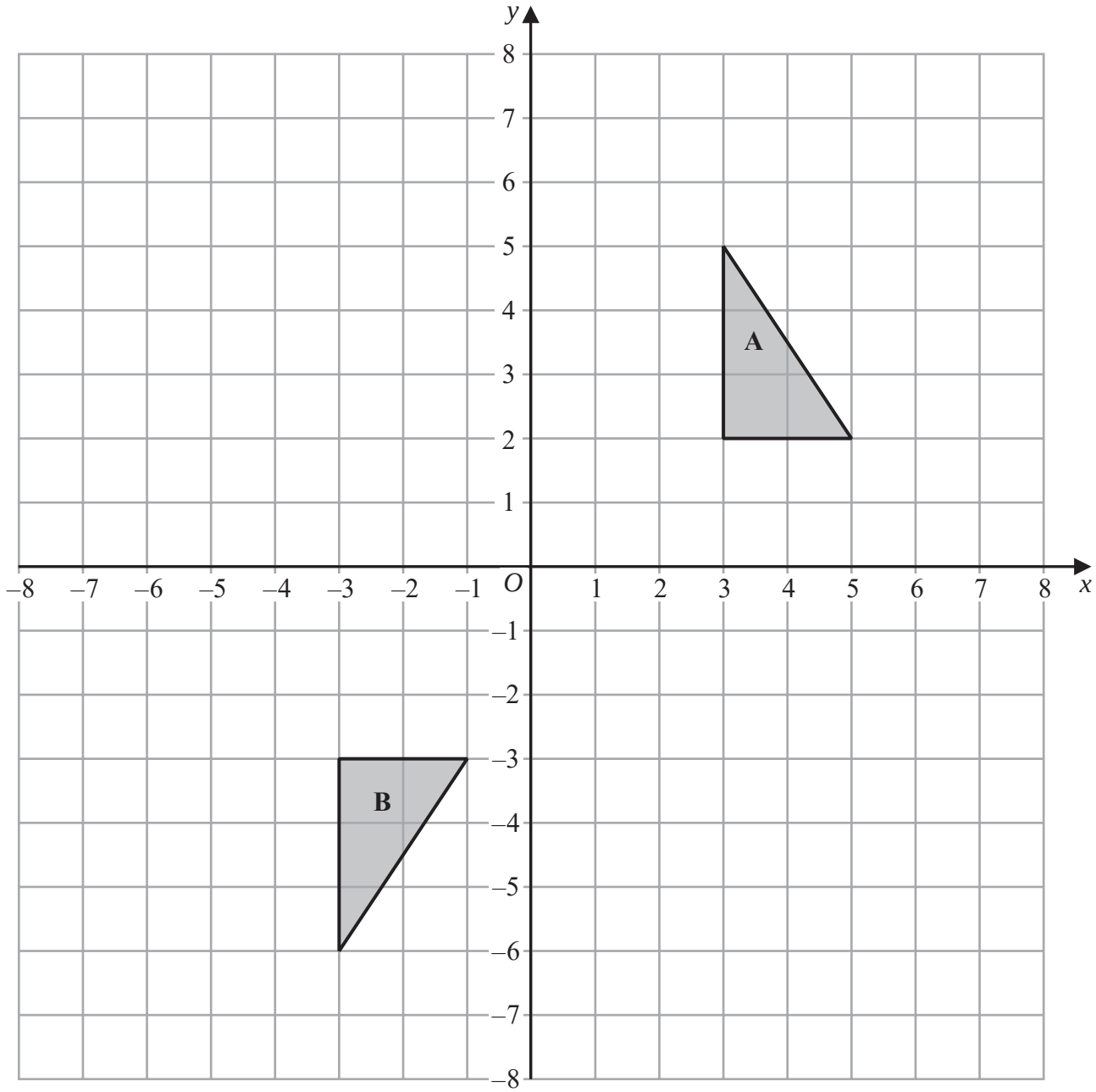
One point on triangle **A** is invariant under the combined transformation.

Find the coordinates of this point.

(..... , ...)

(Total for Question 20 is 2 marks)

5



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

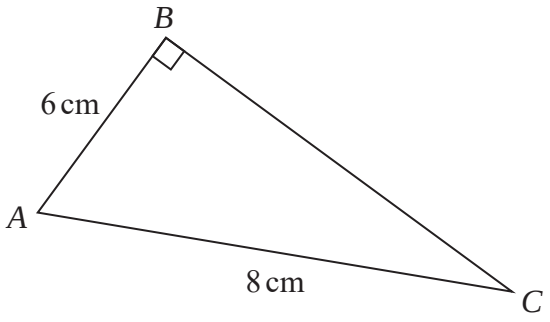
Find the value of c and the value of d.

$c =$ .....

$d =$ .....

(Total for Question 5 is 3 marks)

8 ABC is a right-angled triangle.



Here is Sarah's method to find the length of BC.

$$\begin{aligned} BC^2 &= AB^2 + AC^2 \\ &= 6^2 + 8^2 \\ &= 100 \\ BC &= 10 \end{aligned}$$

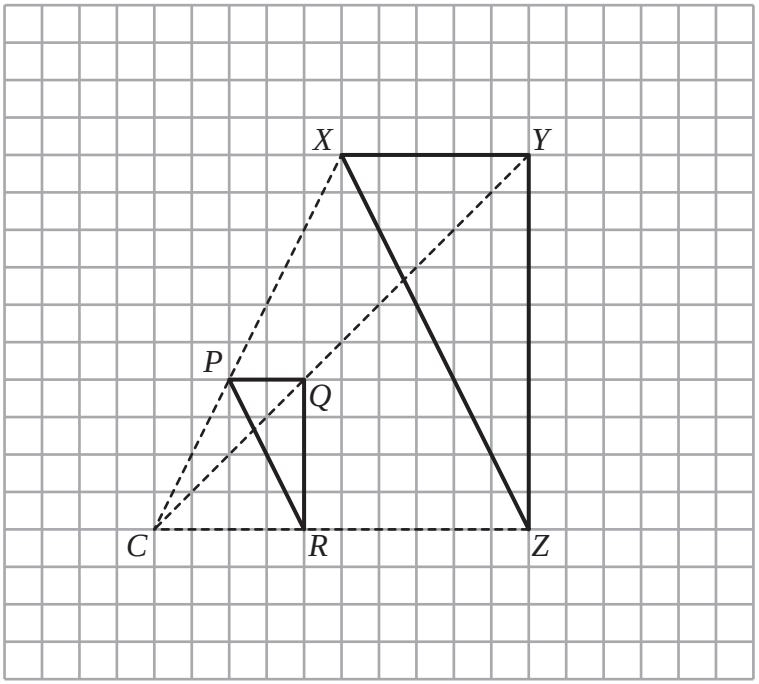
(a) What mistake has Sarah made in her method?

.....

.....

.....

(1)



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

He draws triangle XYZ.

(b) Explain why Roy's diagram is **not** correct.

.....

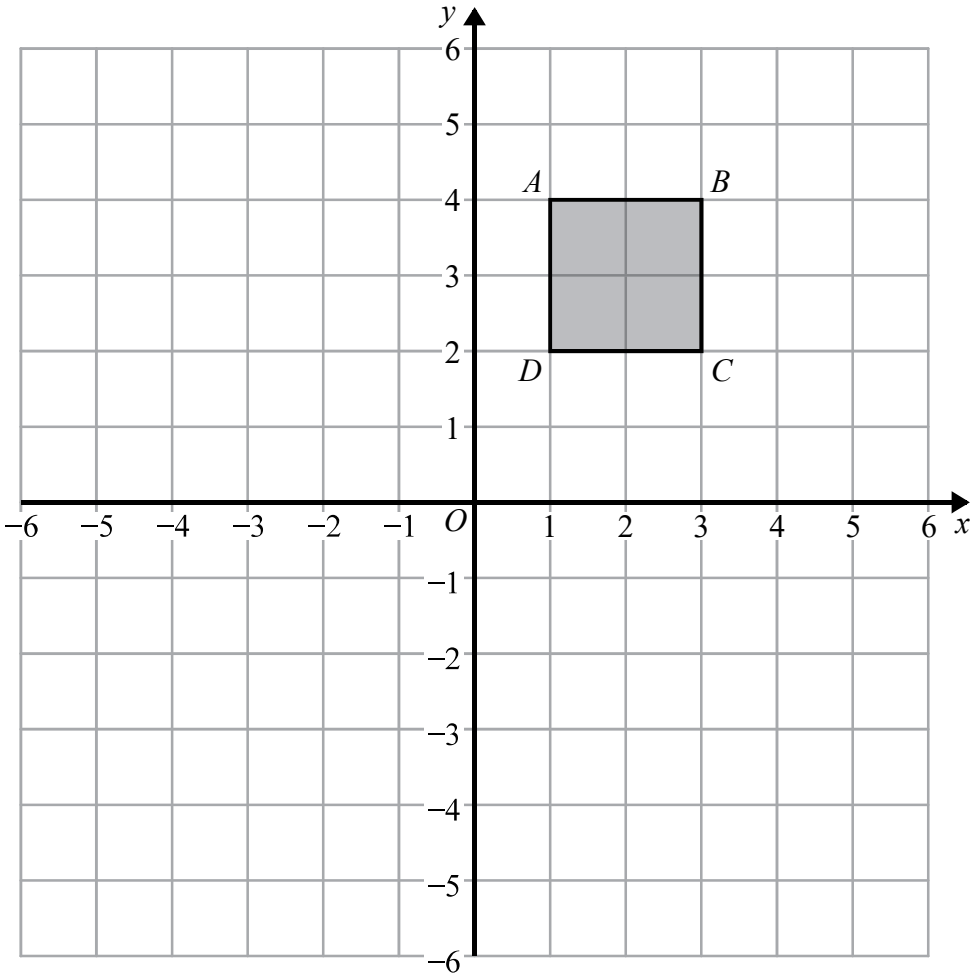
.....

.....

(1)

(Total for Question 8 is 2 marks)

24



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

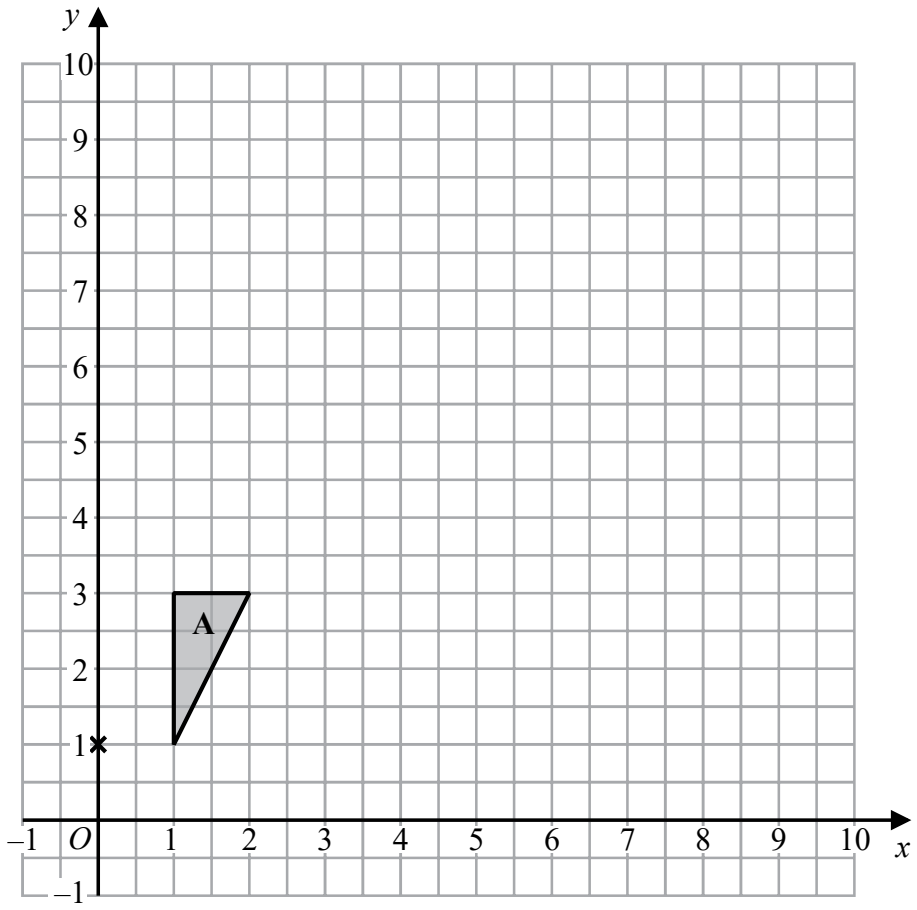
Under the combined transformation, two vertices of the square $ABCD$ are invariant.

Describe fully one possible rotation.

.....

(Total for Question 24 is 2 marks)

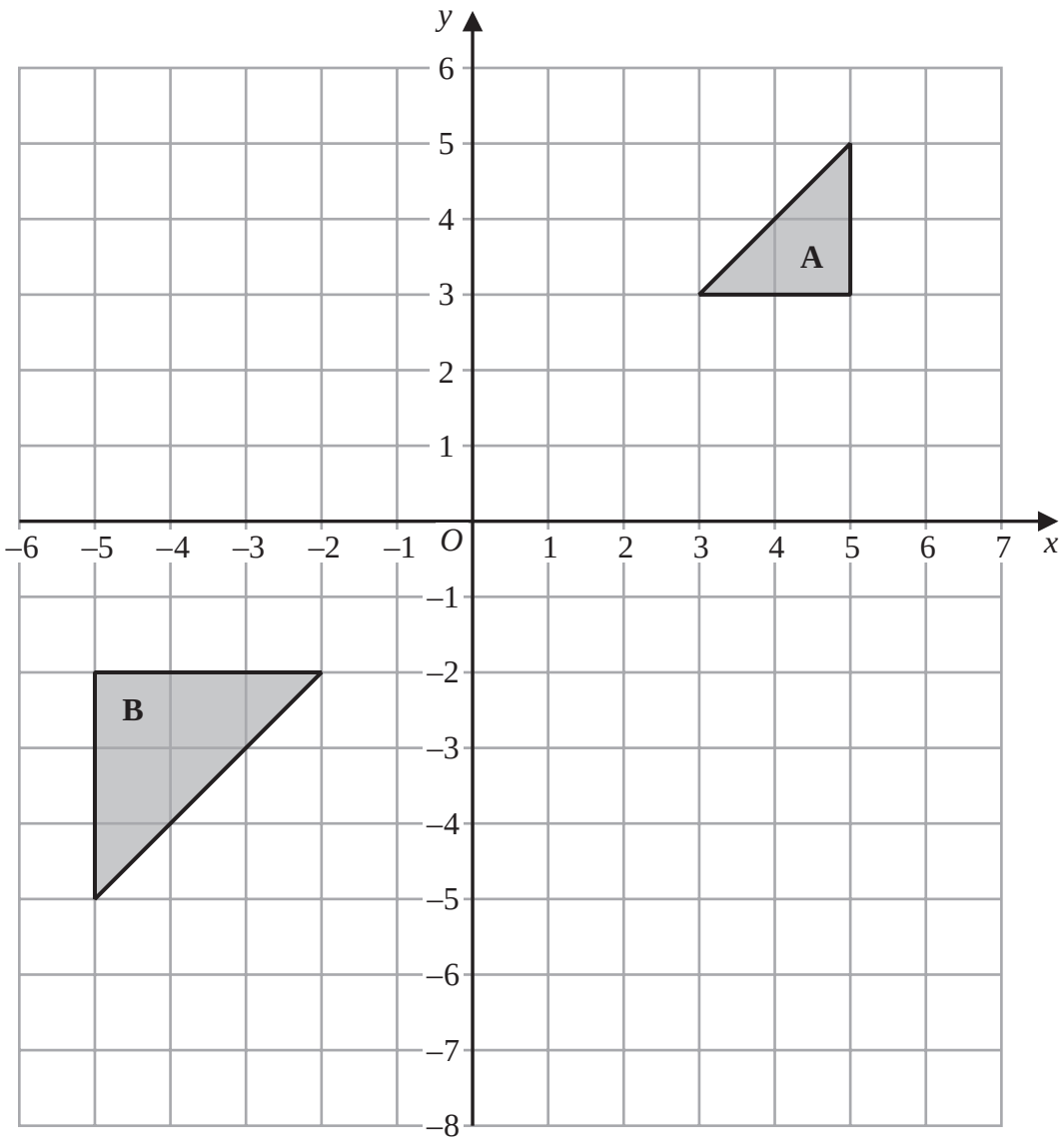
9



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

(Total for Question 9 is 2 marks)

15



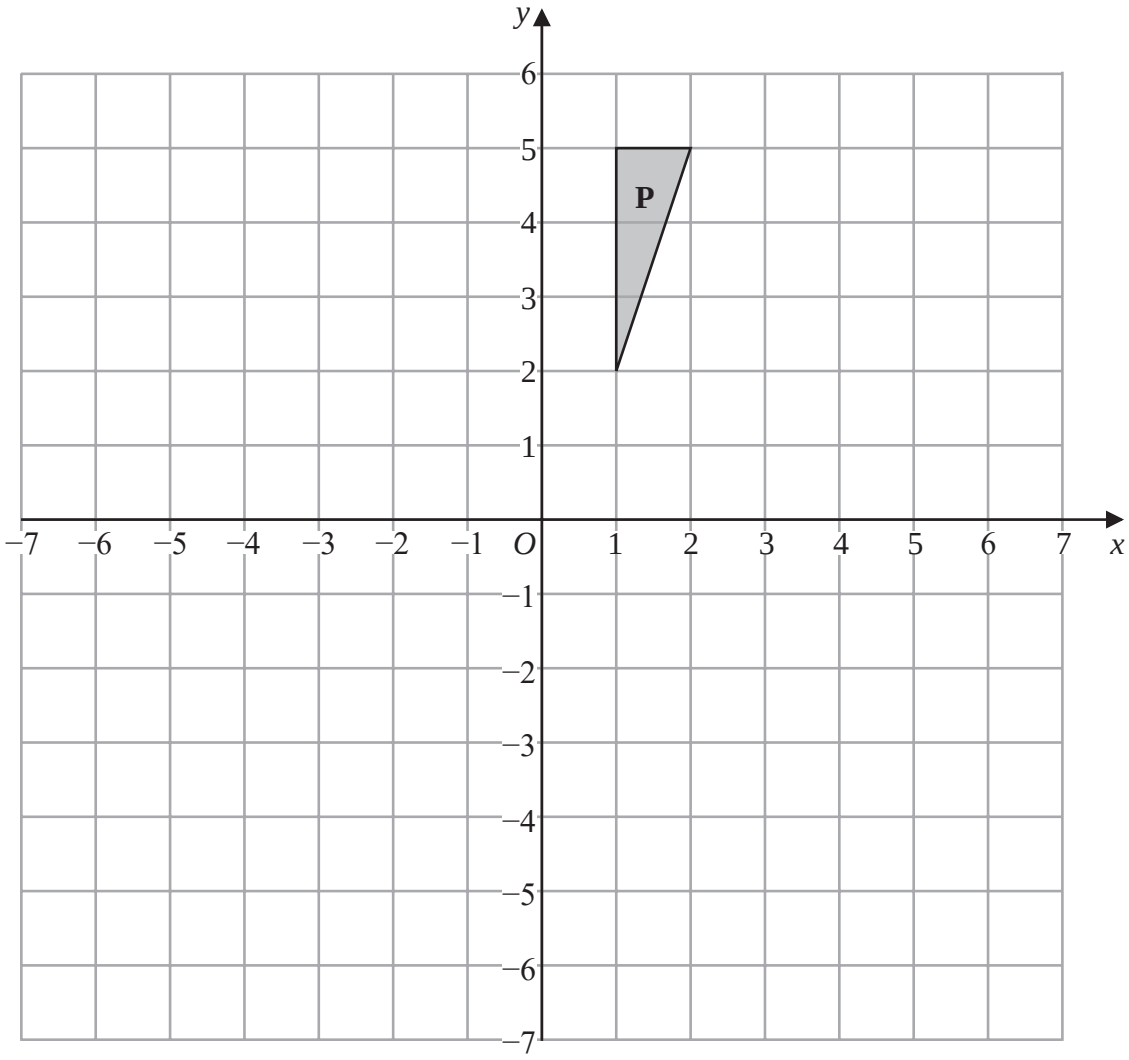
Describe fully the single transformation that maps triangle **A** onto triangle **B**.

.....

.....

(Total for Question 15 is 2 marks)

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



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

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

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

.....

.....

(3)

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

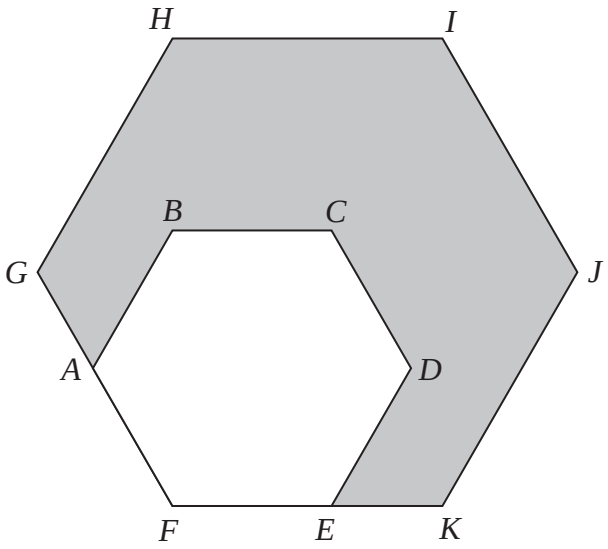
(b) Write down the coordinates of point A.

(..... , ...)

(1)

(Total for Question 11 is 4 marks)

19

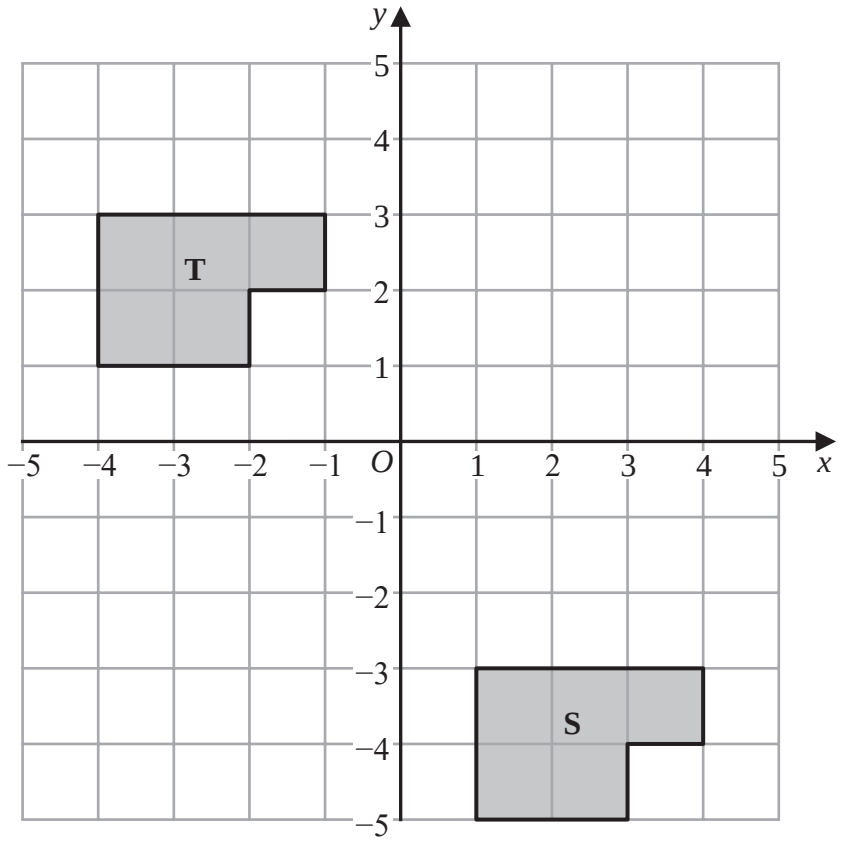


ABCDEF is a regular hexagon with sides of length x.
This hexagon is enlarged, centre F, by scale factor p to give hexagon *FGHIJK*.

Show that the area of the shaded region in the diagram is given by $\frac{3\sqrt{3}}{2}(p^2 - 1)x^2$

(Total for Question 19 is 4 marks)

2



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

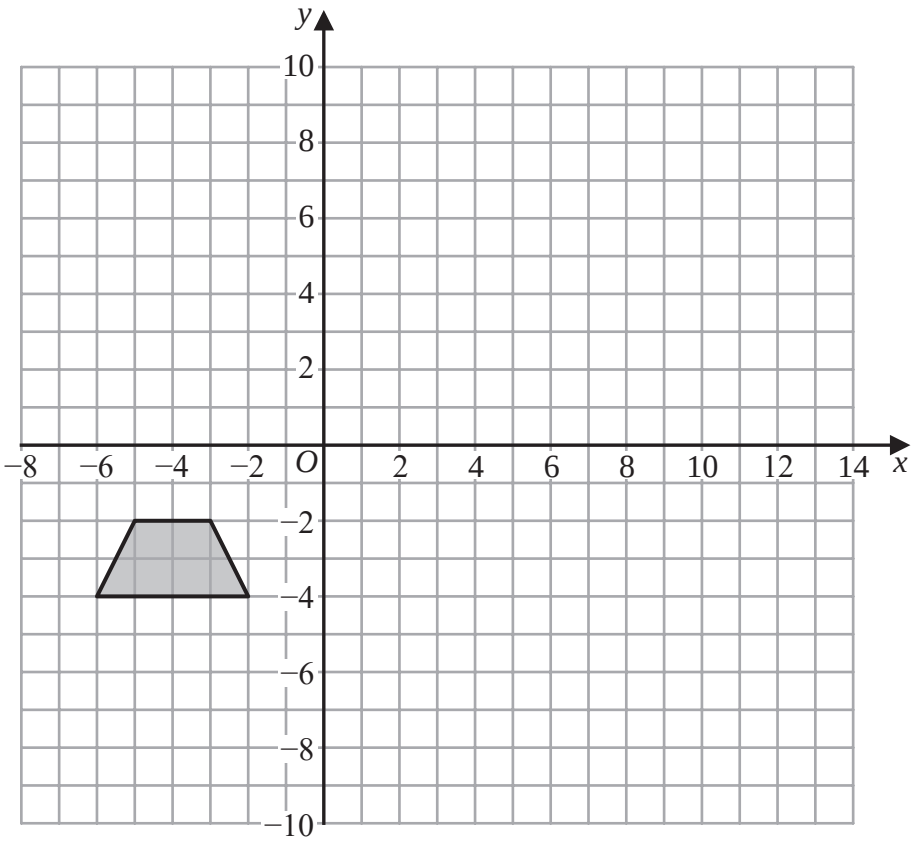
.....

.....

.....

(Total for Question 2 is 2 marks)

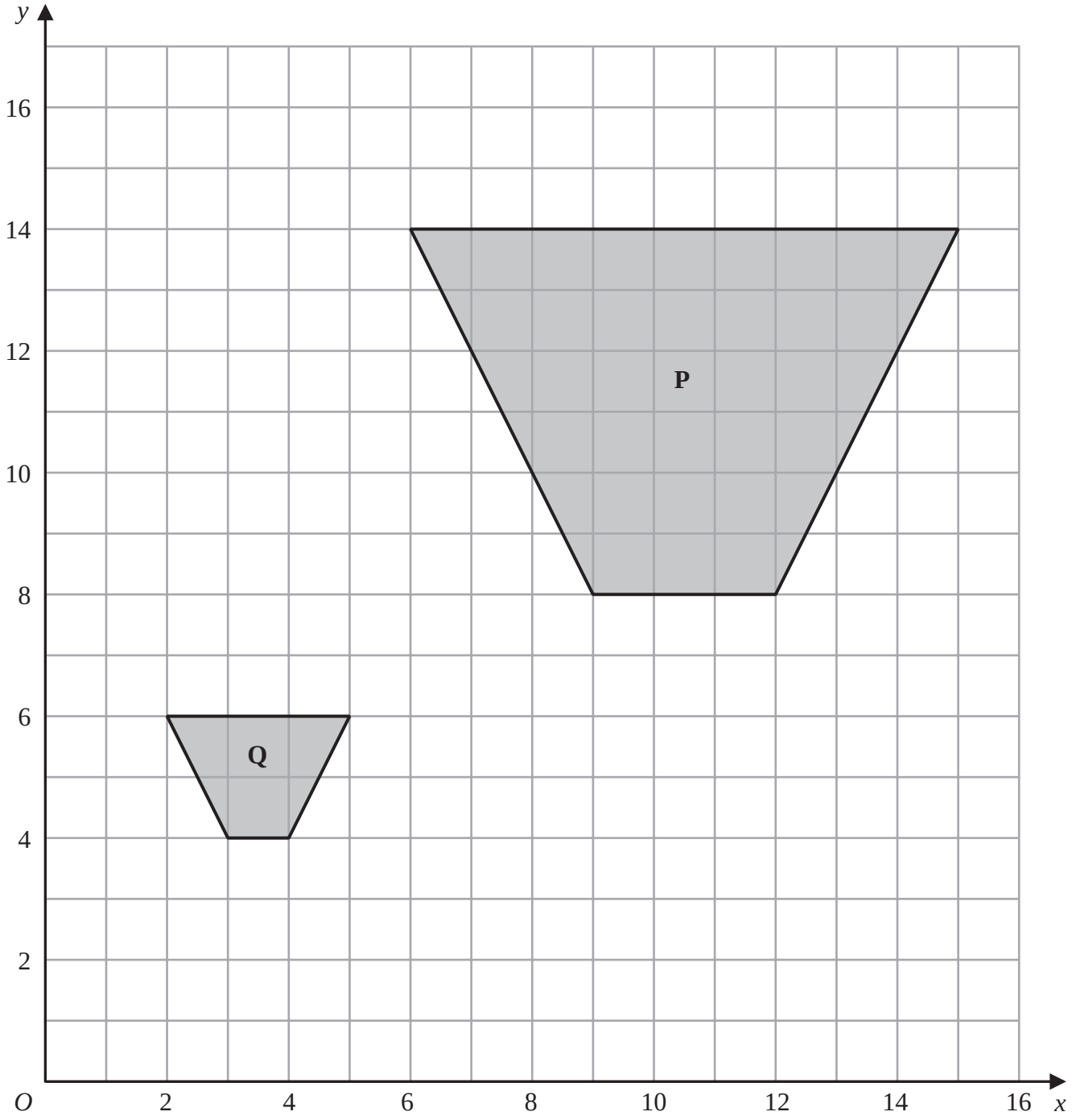
13



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

(Total for Question 13 is 2 marks)

11



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

.....

.....

.....

(Total for Question 11 is 2 marks)

18 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**.

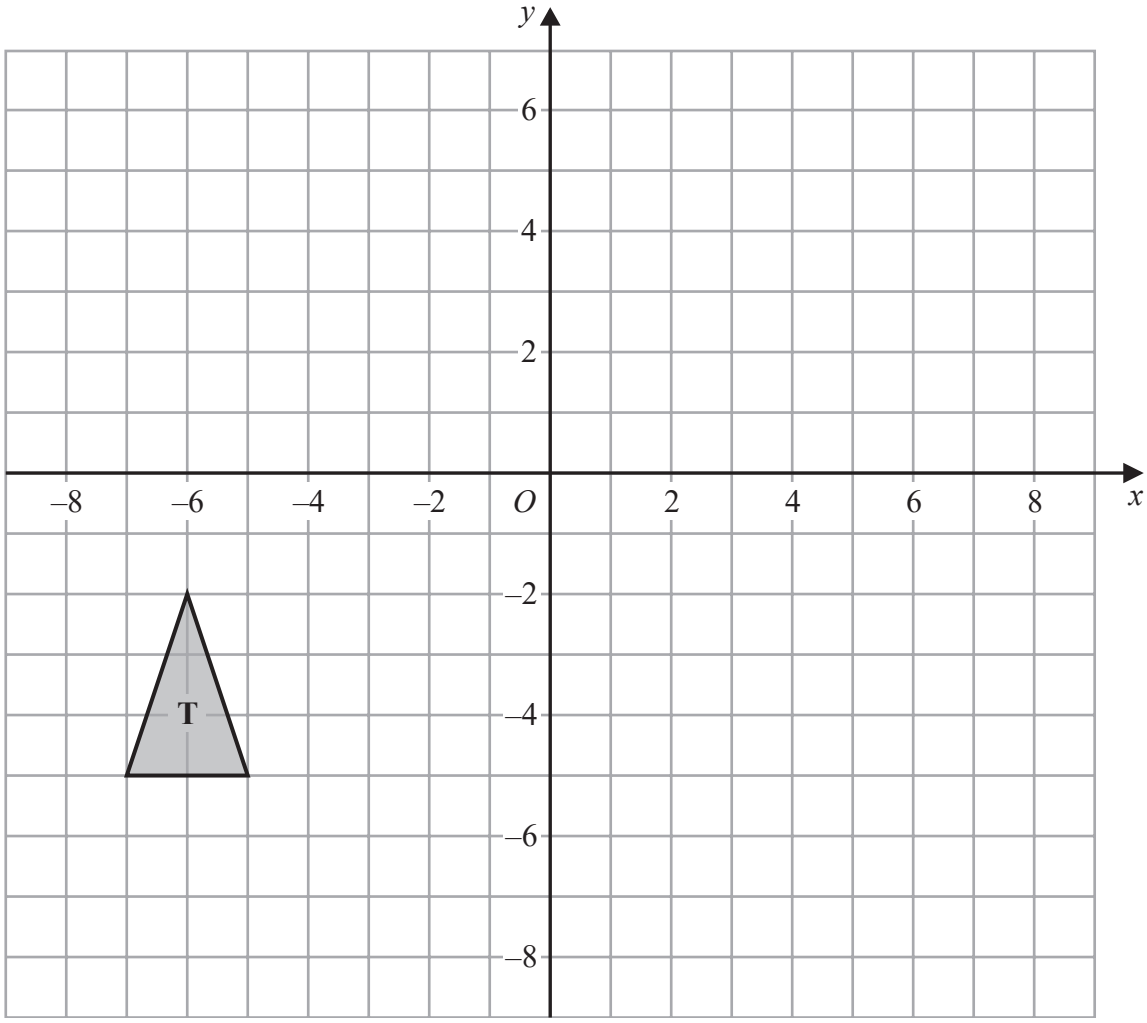
.....

.....

.....

(Total for Question 18 is 2 marks)

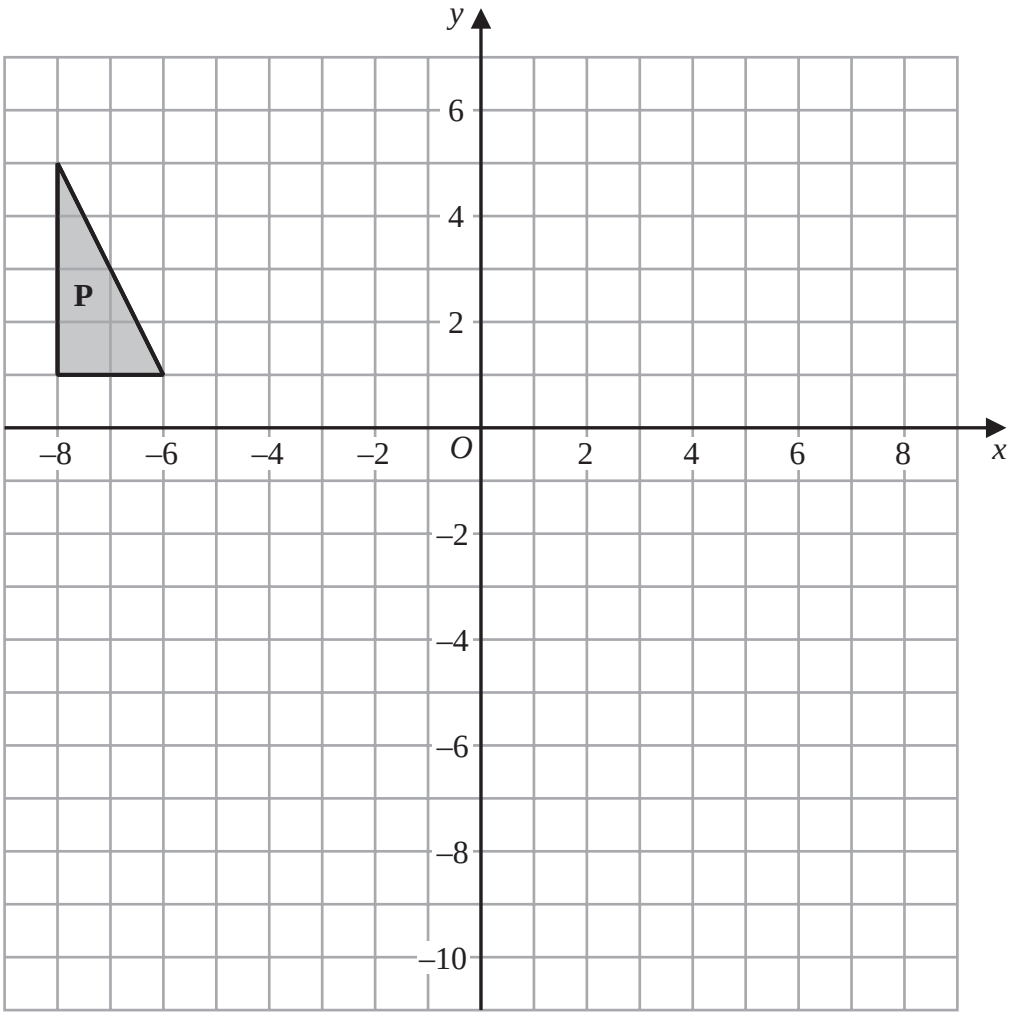
16



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

(Total for Question 16 is 2 marks)

18



(a) Enlarge triangle **P** by scale factor $-1\frac{1}{2}$ with centre of enlargement (–2, –1)

Label your image **Q**.

(2)

Triangle **P** is transformed by a combined transformation of a rotation of 90° anticlockwise about the origin followed by a translation to give triangle **R**.

Exactly one vertex of triangle **P** is invariant under the combined transformation.

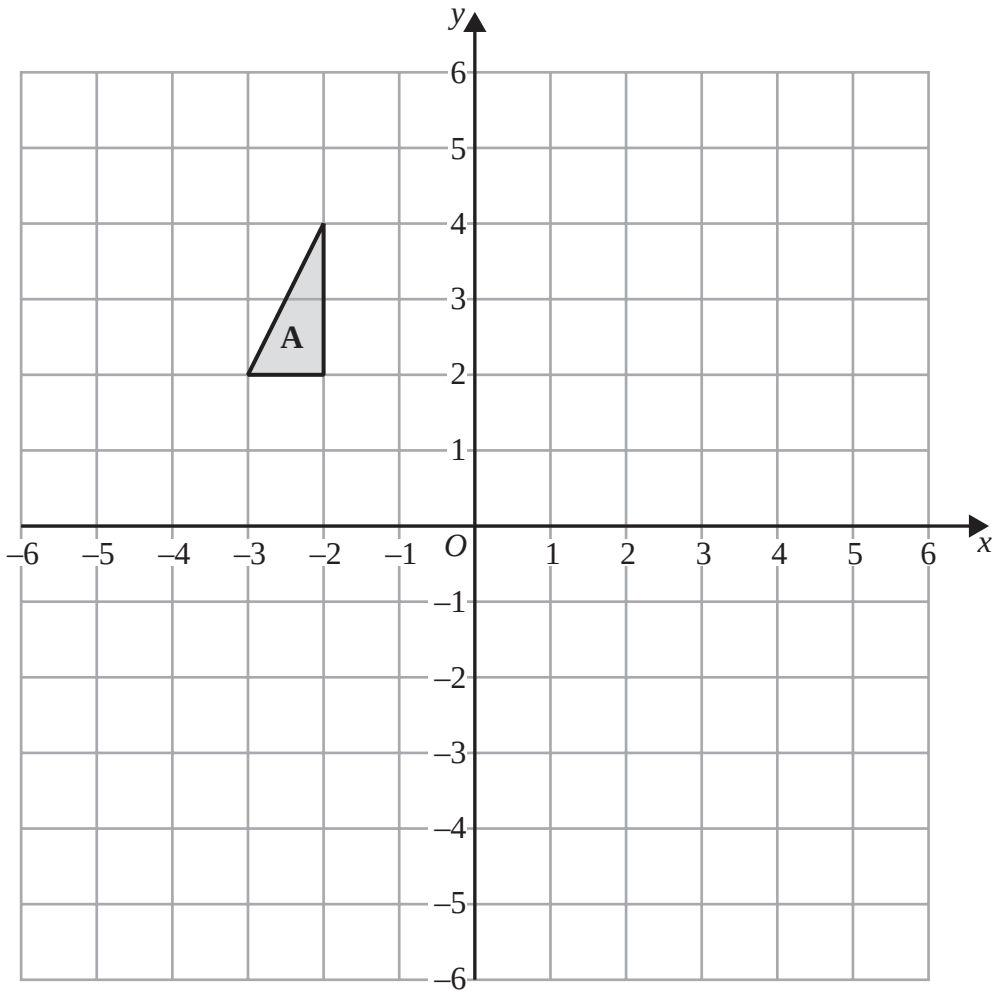
(b) Find one possible column vector for the translation.

(.....)
(.....)

(1)

(Total for Question 18 is 3 marks)

11



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**.

.....

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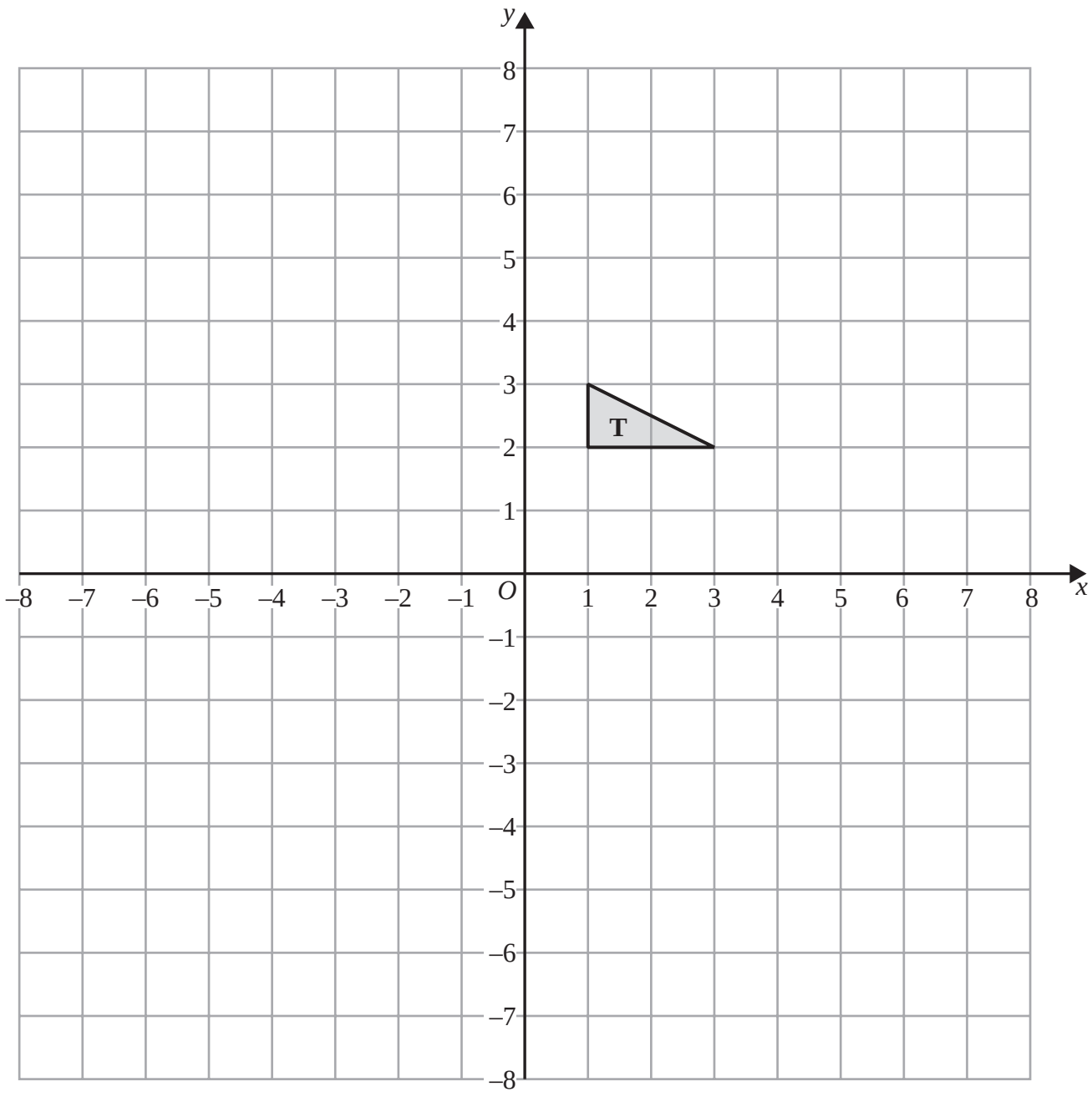
.....

(Total for Question 11 is 3 marks)

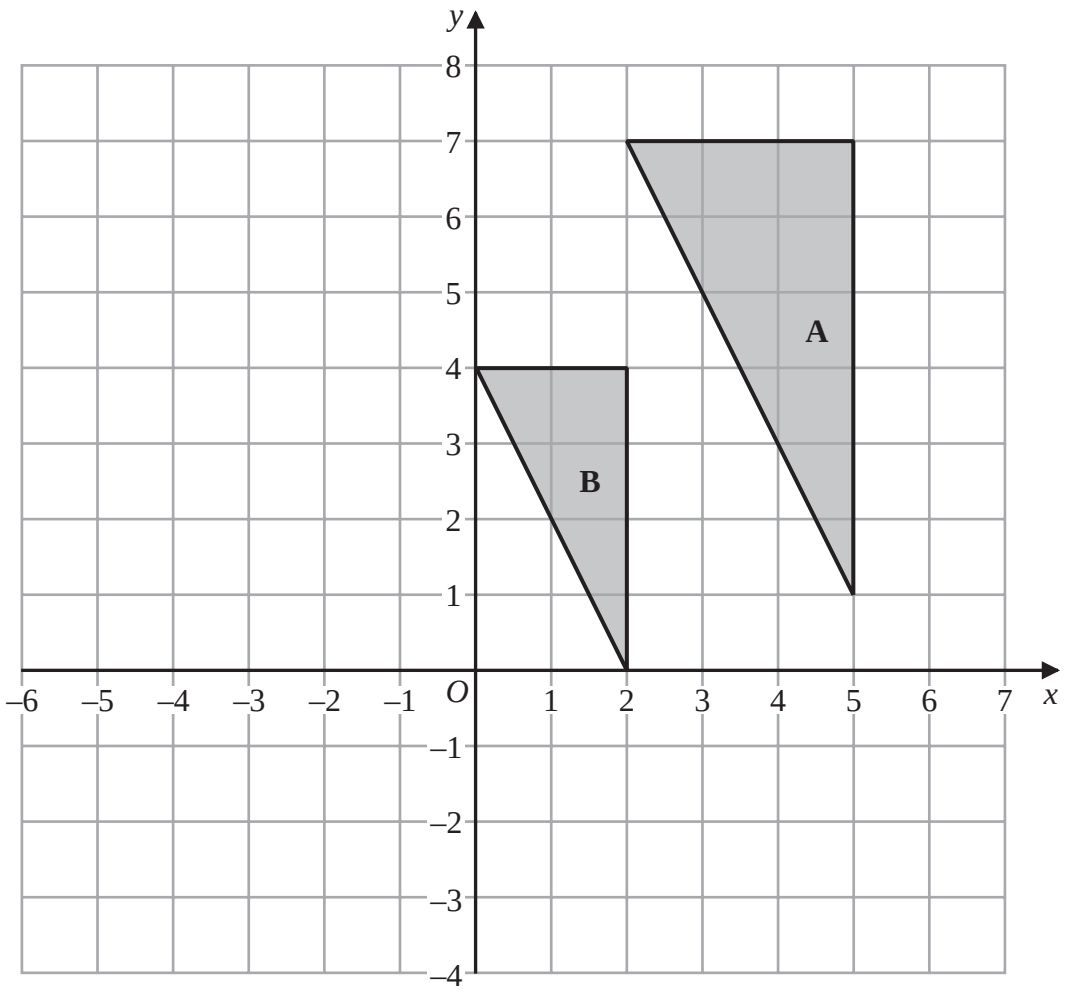
12 The diagram shows triangle **T** drawn on a grid.



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

(Total for Question 12 is 2 marks)

11



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

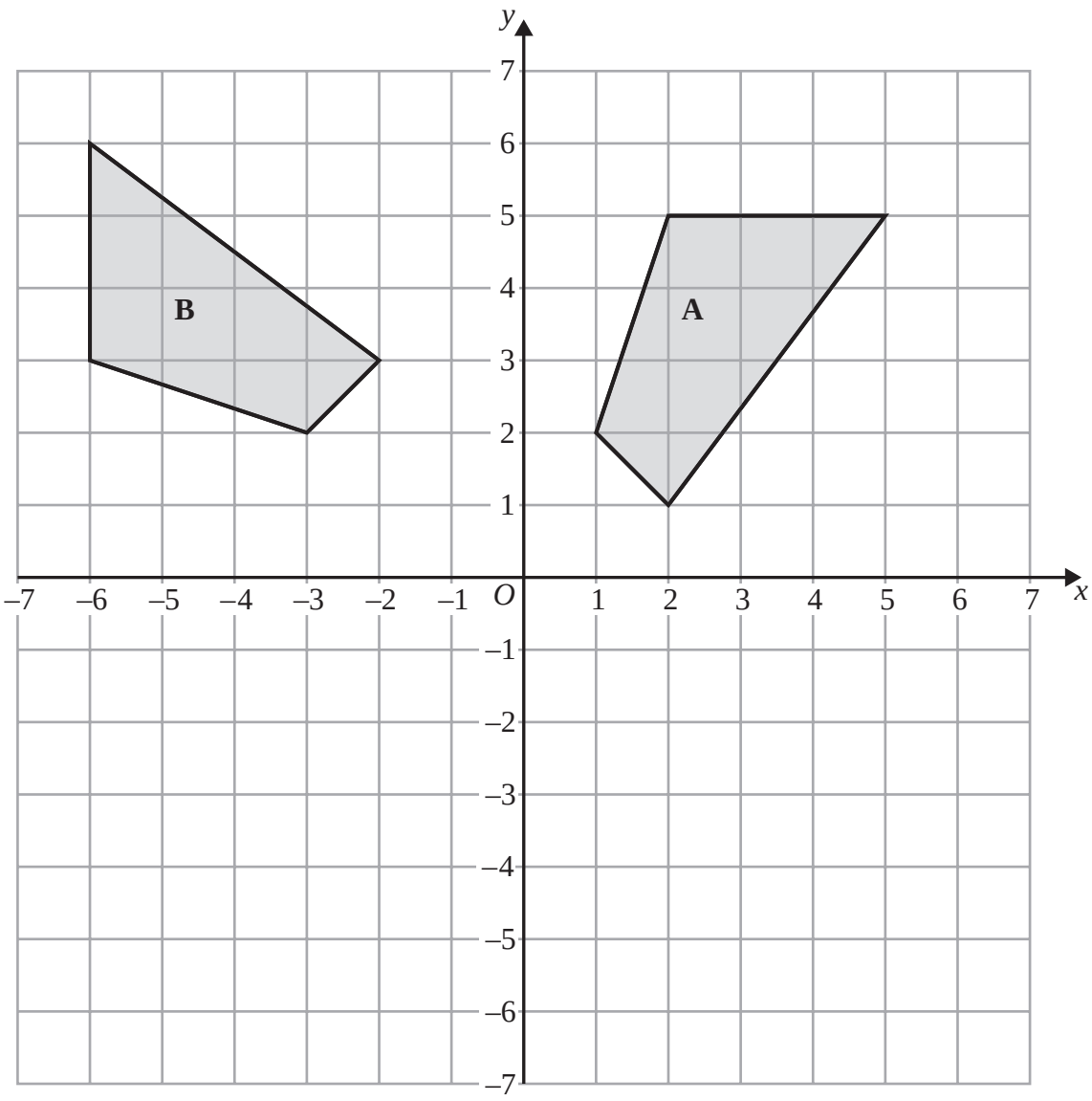
.....

.....

.....

(Total for Question 11 is 2 marks)

9



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

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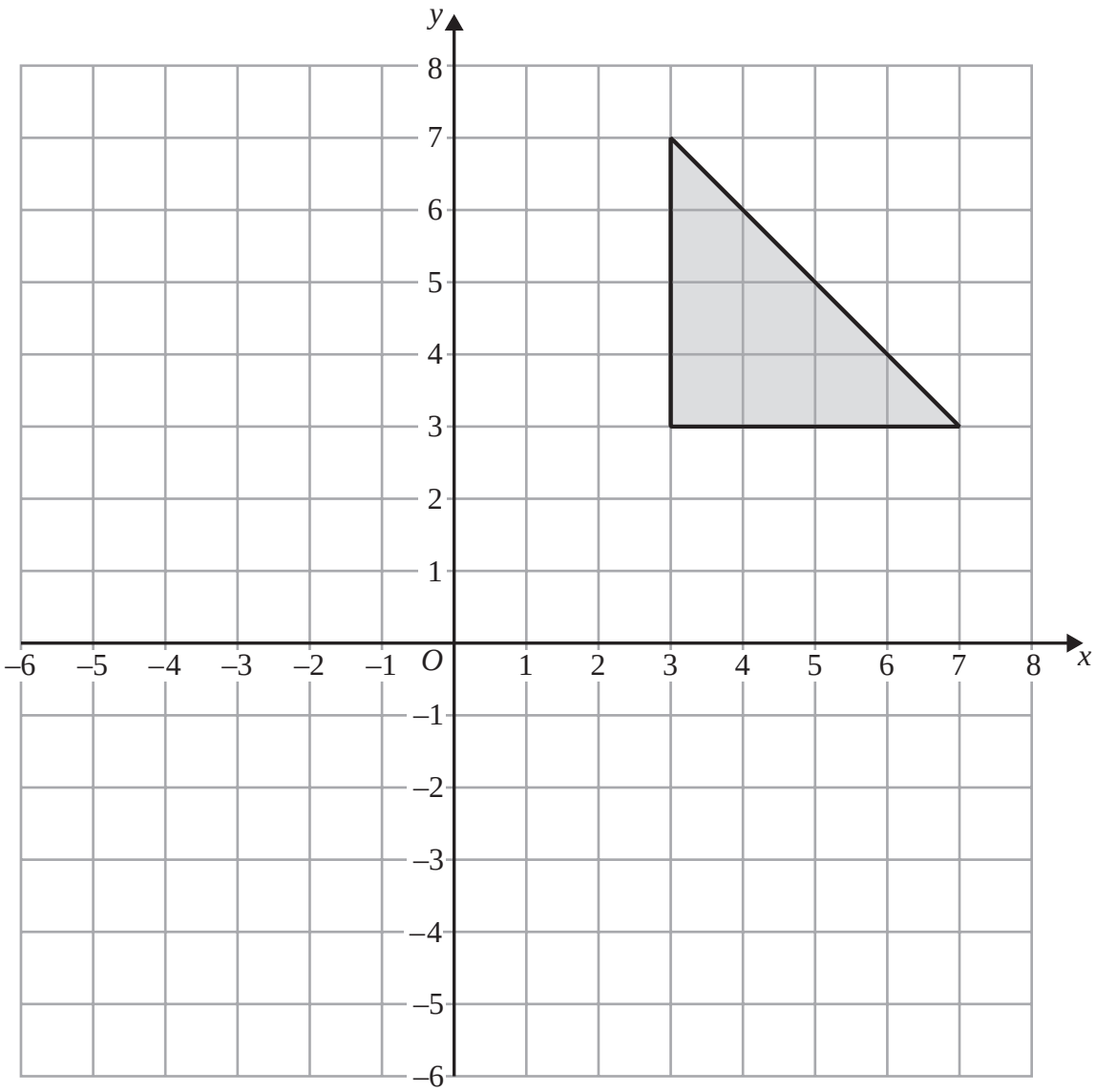
.....

.....

(2)



(b) Enlarge the triangle by scale factor $\frac{1}{2}$ centre (–1, –3)

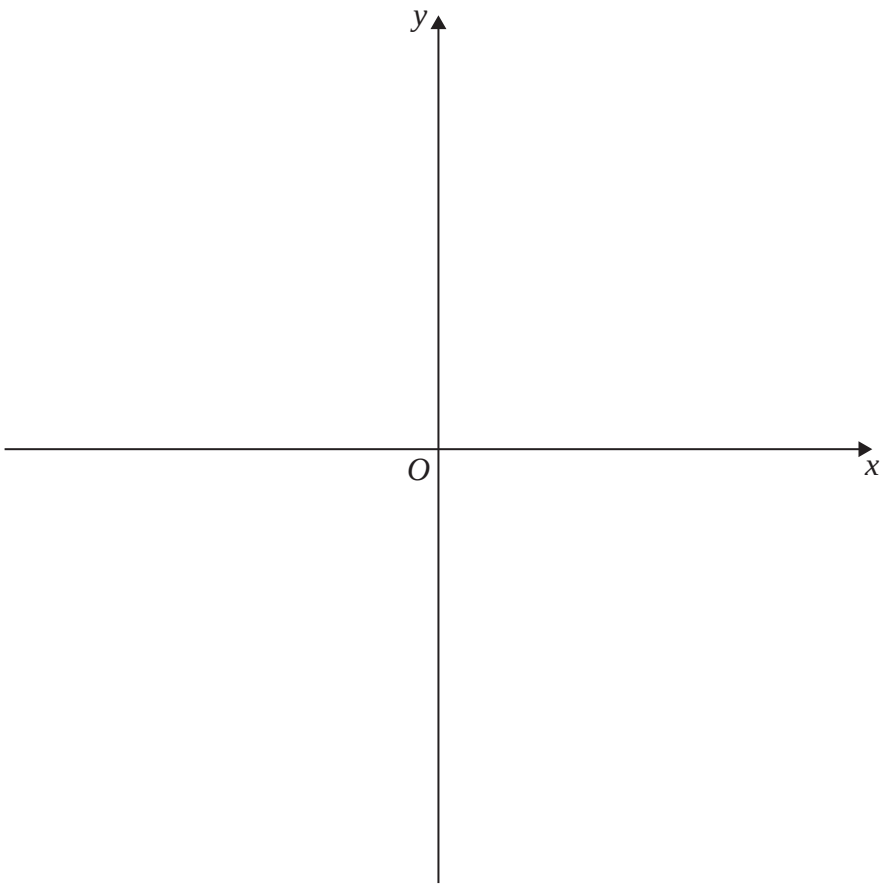
(2)

(Total for Question 9 is 4 marks)

22 The equation of circle **A** is $x^2 + y^2 = 25$

Circle **A** is translated by the vector $\begin{pmatrix} 0 \\ -2 \end{pmatrix}$ to give circle **B**.

Sketch circle **B**.
Show the coordinates of
the centre of circle **B**
and the points where circle **B** meets the *y*-axis.



(Total for Question 22 is 3 marks)