Name: SOLUTIONS

GCSE (1 - 9) Combined Transformations	Solutions:

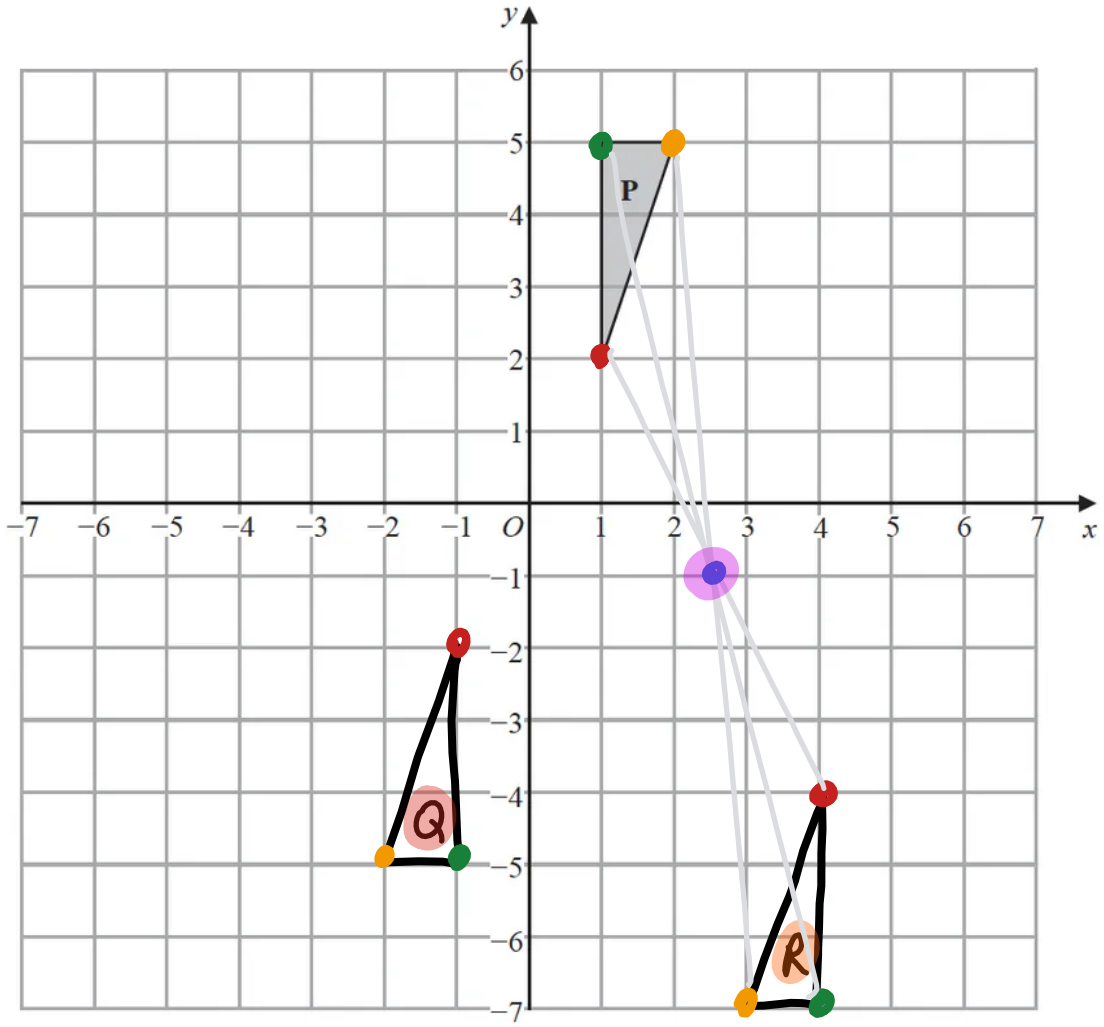
These questions represent all of the times that this topic has appeared in unlocked Pearson Edexcel GCSE maths papers as of July 2023.
More questions can be found at examq.co.uk

Question	Where the question appeared
1	Edexcel, GCSE, Autumn 2020, Paper 3H, Q11
2	Edexcel, GCSE, Autumn 2019, Paper 2H, Q24
3	Edexcel, GCSE, Summer 2019, Paper 1H, Q5
4	Edexcel, GCSE, Autumn 2018, Paper 2H, Q8
5	Edexcel, GCSE, Autumn 2018, Paper 3H, Q20
6	Edexcel, GCSE, Summer 2018, Paper 1H, Q7
7	Edexcel, GCSE, Summer 2017, Paper 2H, Q9

Combined Transformations (Past Paper Questions)

1

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**.

Rotation of 180 degrees centre (2.5, -1)

Or

enlargement 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.

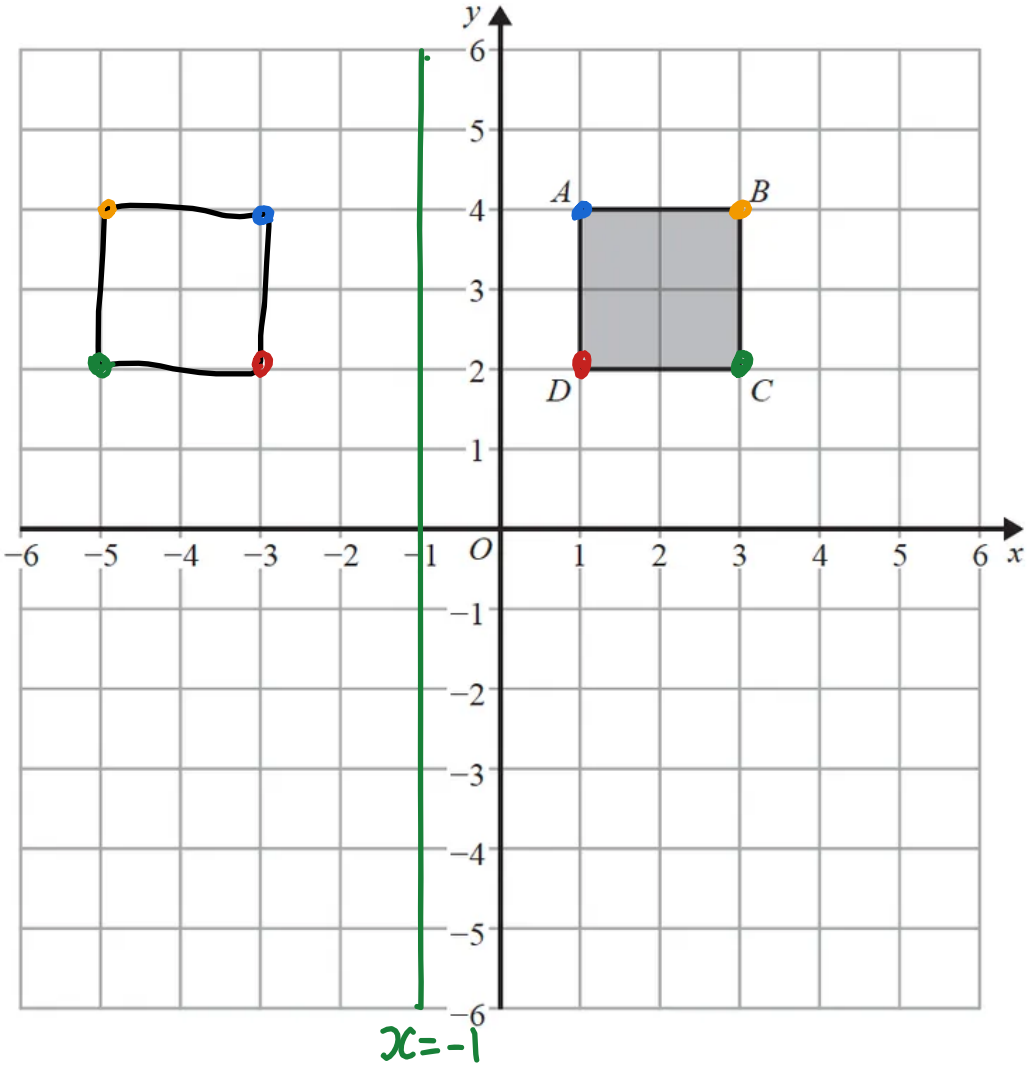
(2.5 , -1)

(1)

(Total for Question 11 is 4 marks)

[Edexcel, GCSE, Autumn 2020, Paper 3H, Q11]

2



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.

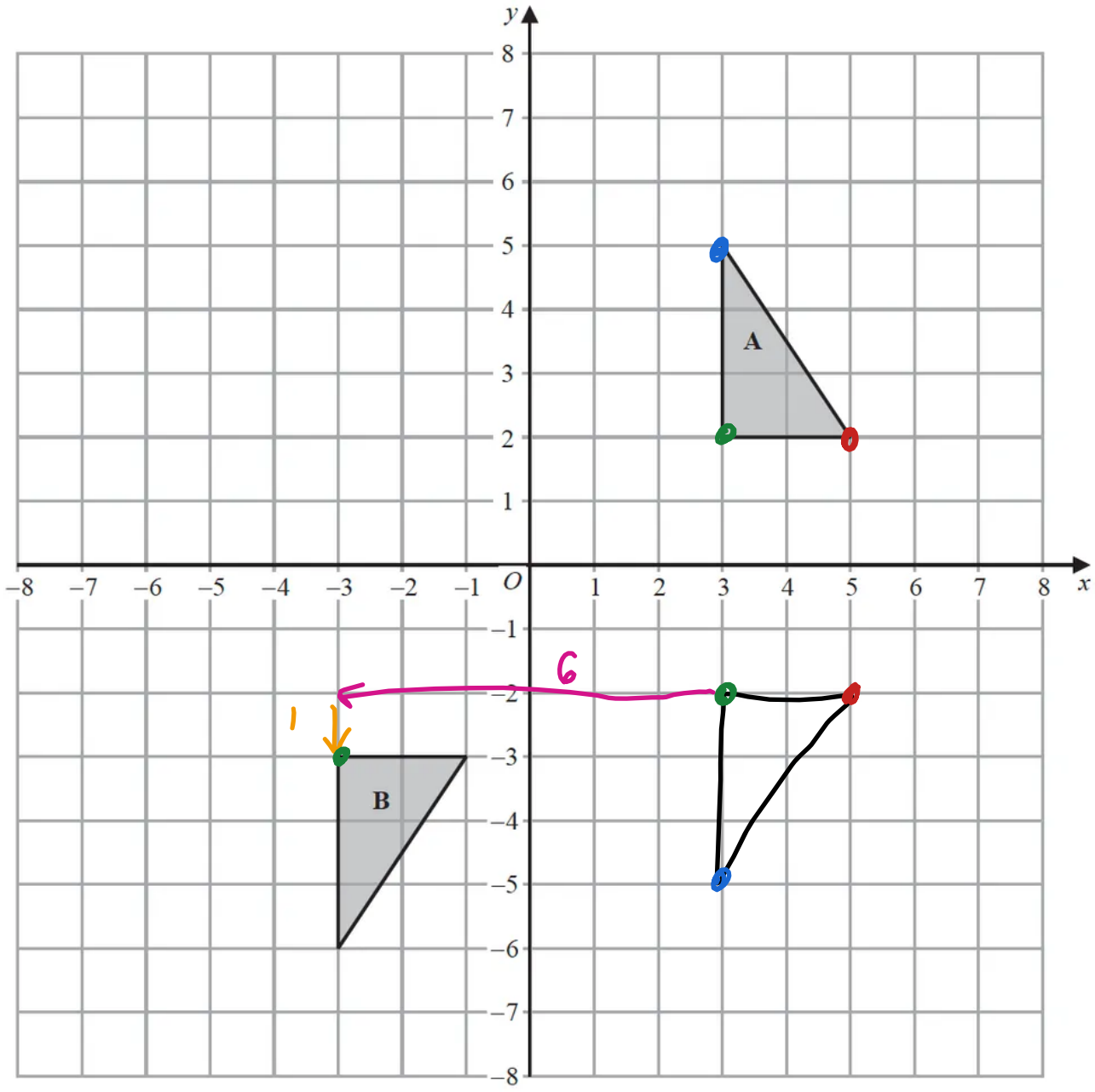
Any one from below

(Total for Question 24 is 2 marks)

[Edexcel, GCSE, Autumn 2019, Paper 2H, Q24]

for (rotation) 90 clockwise about (–1, 0)
or (rotation) 90 anticlockwise about (–1, 6)
or (rotation) 180 about (–1, 2)
or (rotation) 180 about (–1, 4)

3



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.

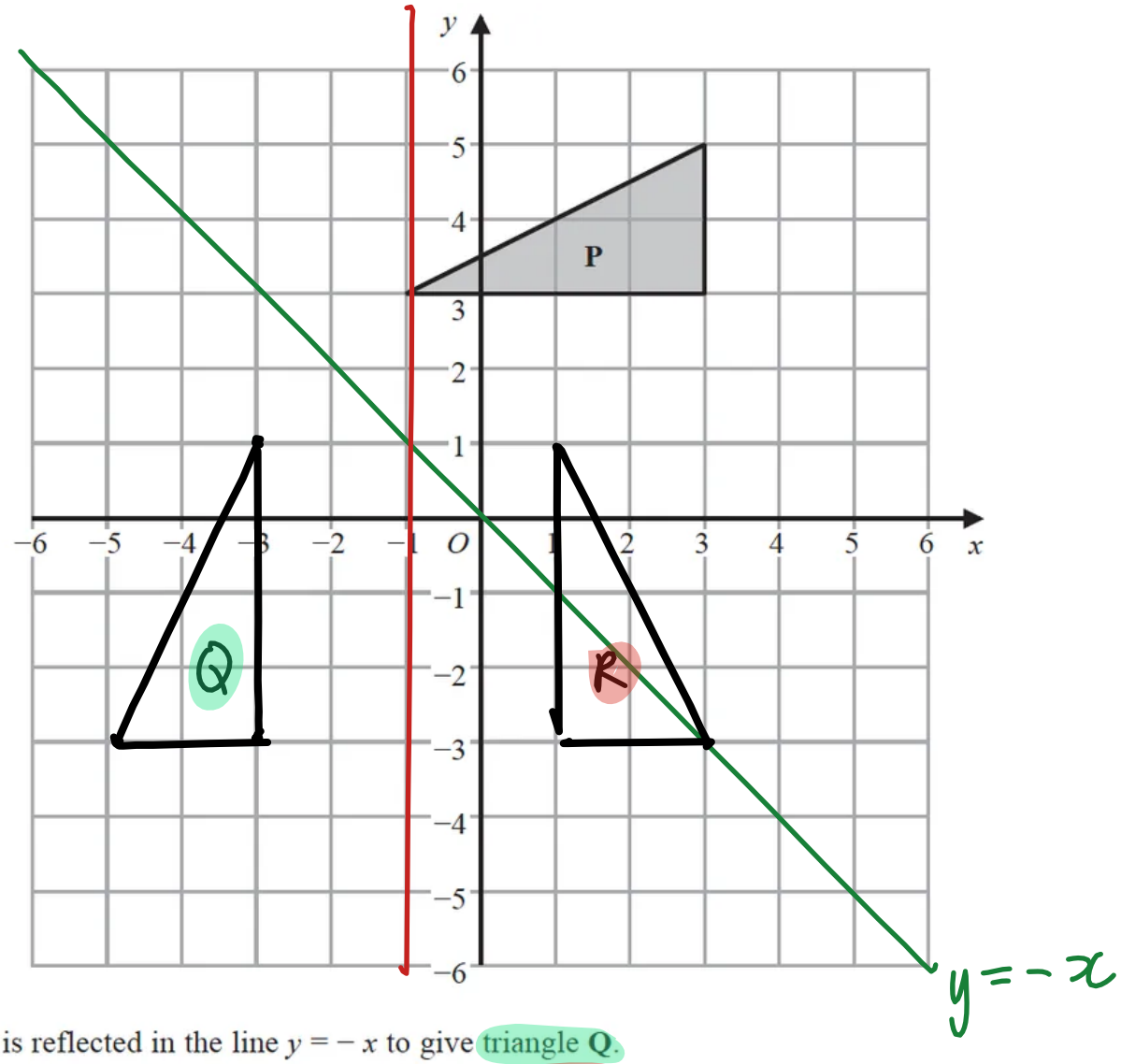
$c =$ -6

$d =$ -1

(Total for Question 5 is 3 marks)

[Edexcel, GCSE, Summer 2019, Paper 1H, Q5]

4



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**.

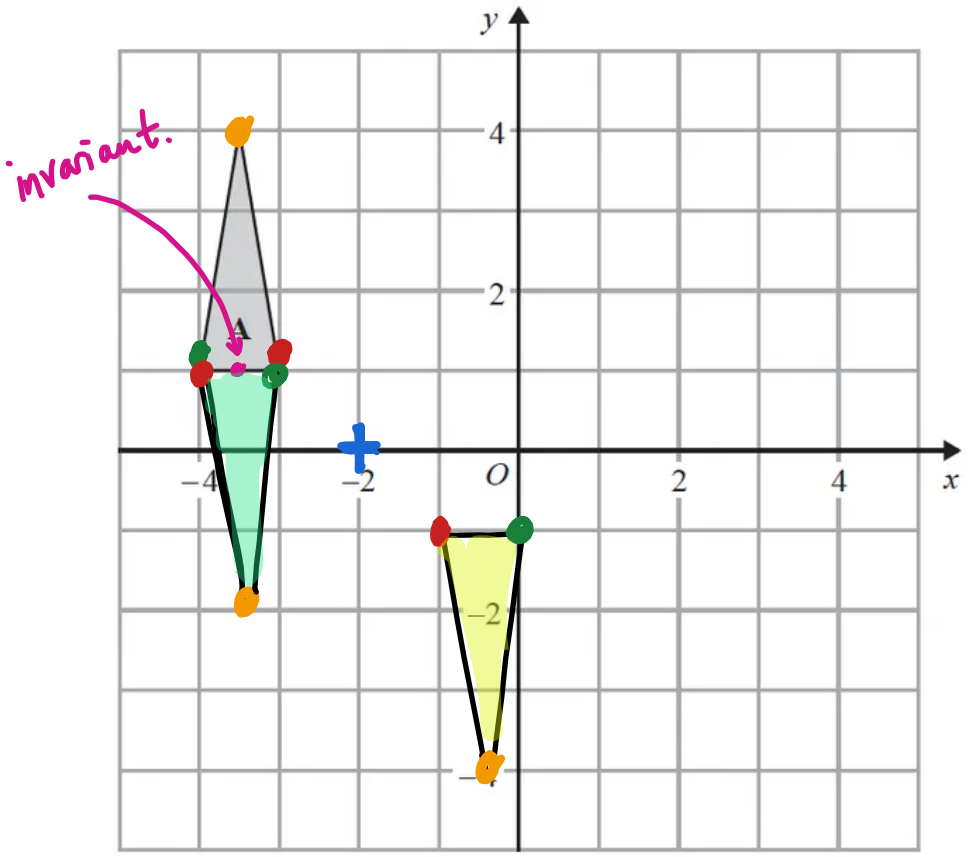
Describe fully the single transformation that maps triangle **R** to triangle **P**.

Rotation 90 degrees anticlockwise, centre (-1,1)

(Total for Question 8 is 3 marks)

[Edexcel, GCSE, Autumn 2018, Paper 2H, Q8]

5



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.

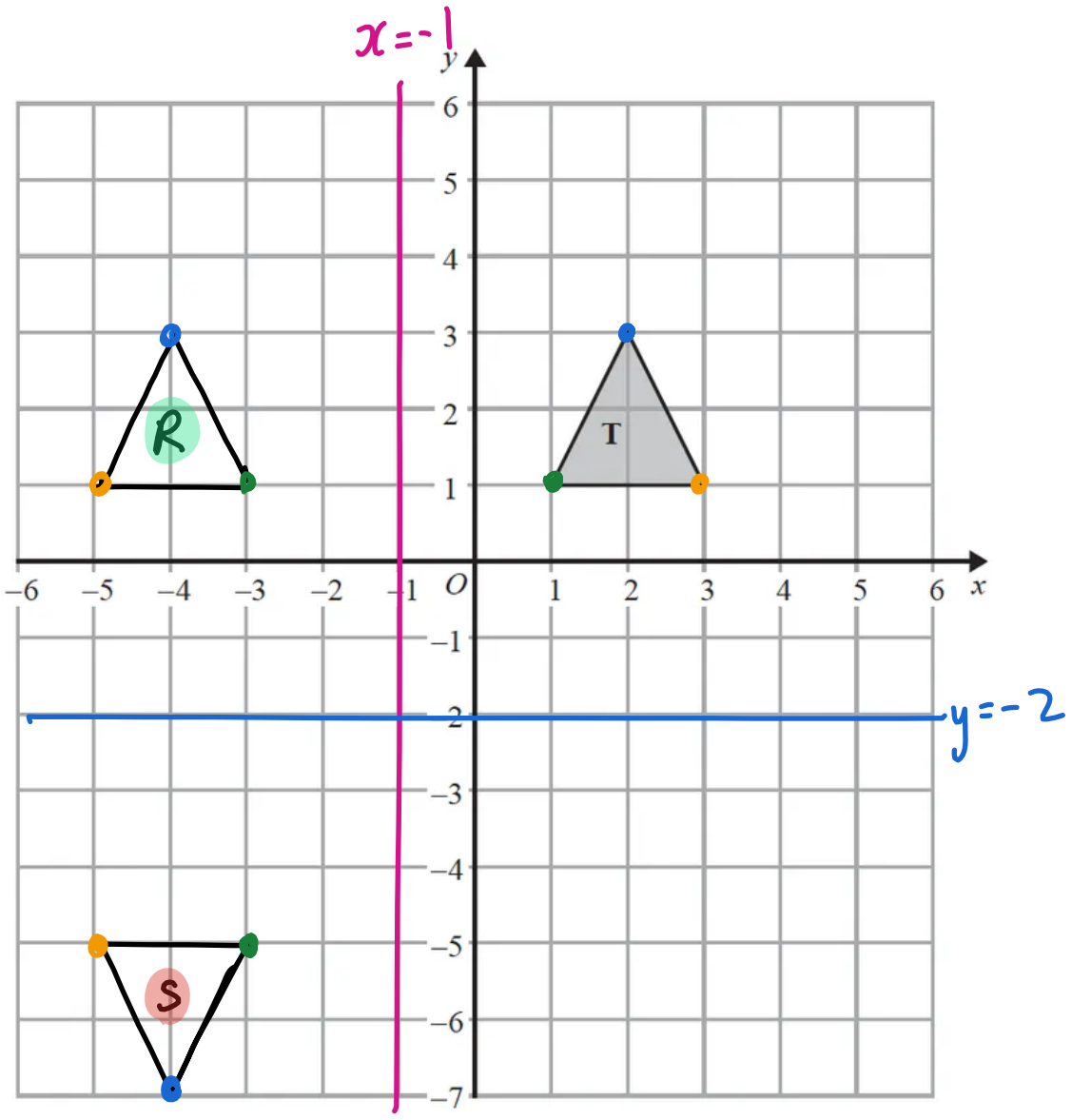
Find the coordinates of this point.

(-3.5 , 1)

(Total for Question 20 is 2 marks)

[Edexcel, GCSE, Autumn 2018, Paper 3H, Q20]

6



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 degrees about (-1, -2)

or

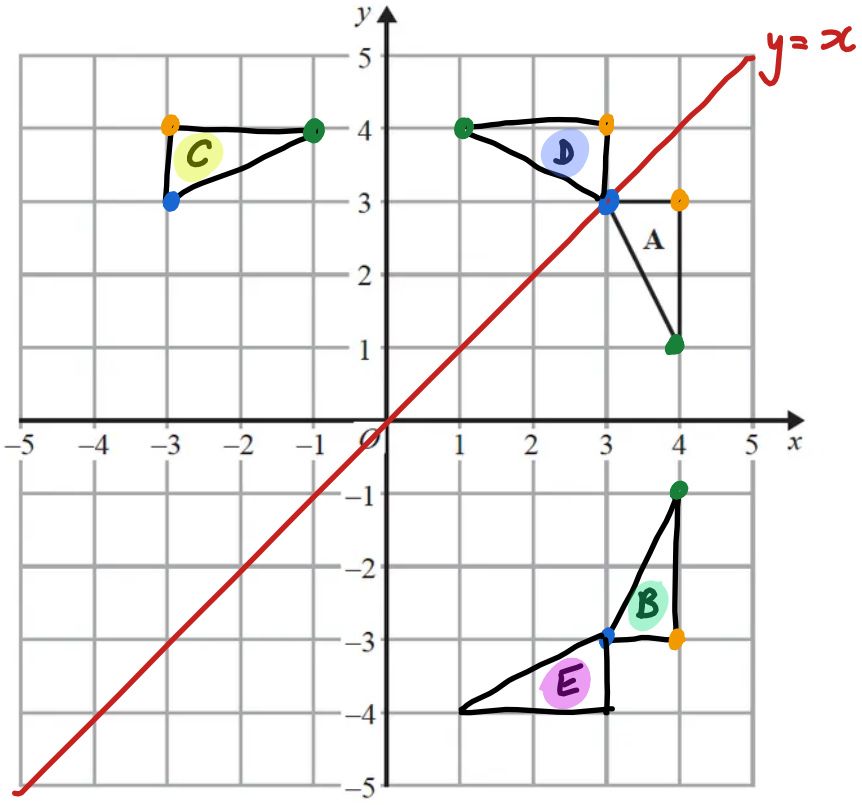
Enlargement. scale factor -1 centre (-1, -2)

(Total for Question 7 is 2 marks)

[Edexcel, GCSE, Summer 2018, Paper 1H, Q7]

7

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 she is not correct.

She would be if the final reflection to get triangle E was in the y axis.

(Total for Question 9 is 3 marks)

[Edexcel, GCSE, Summer 2017, Paper 2H, Q9]