

WA7MMGTW8

Two-dimensional space and structures

Core + Challenge

The Cartesian Plane and Transformations

I can plot points in all four quadrants and describe translations, reflections in the axes and rotations about the origin.

Name: _____ Date: _____ Score: _____ / 58

Key idea

A point is written (x, y) : go across first, then up or down. Quadrants are numbered anticlockwise from the top right.

Translation: slide. '3 right, 2 down' $\rightarrow$ add 3 to x , subtract 2 from y .

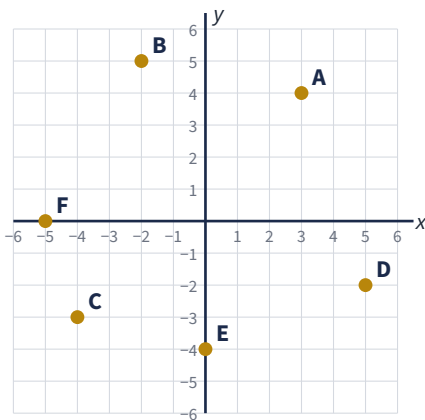
Reflection in the x-axis: $(x, y) \rightarrow (x, -y)$. **In the y-axis:** $(x, y) \rightarrow (-x, y)$.

Rotation about O: $180^\circ \rightarrow (-x, -y)$; 90° anticlockwise $\rightarrow (-y, x)$; 90° clockwise $\rightarrow (y, -x)$. Images are always the same size and shape.

A Fluency *practise the skill*

/ 16 marks

Q1–8 and Q16 use the grid. 1 mark each.



1. Coordinates of A _____

9. A translated 2 left, 3 down _____

2. Coordinates of B _____

10. A reflected in the x-axis _____

3. Coordinates of C _____

11. A reflected in the y-axis _____

4. Coordinates of D _____

12. A rotated 180° about O _____

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5. Coordinates of E _____

13. C translated 5 right _____

6. Coordinates of F _____

14. D reflected in the y-axis _____

7. Quadrant of B _____

15. D rotated 90° anticlockwise about O _____

8. Quadrant of D _____

16. Distance from B to $(-2, -1)$ _____

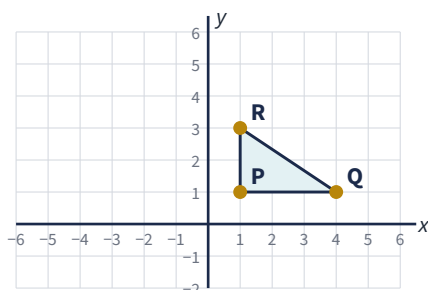
B

Core *apply the skill to problems*

/ 22 marks

1 Translate triangle PQR 5 units left and 2 units up. Draw the image and list its vertices.

[3 marks]



Answer: _____

2 Reflect the triangle with vertices $(2, 1)$, $(5, 1)$ and $(2, 4)$ in the x-axis. List the image's vertices.

[2 marks]

.....

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Answer: _____

3 Rotate the square $(1, 1)$, $(3, 1)$, $(3, 3)$, $(1, 3)$ by 180° about the origin. List the image's vertices.

[2 marks]

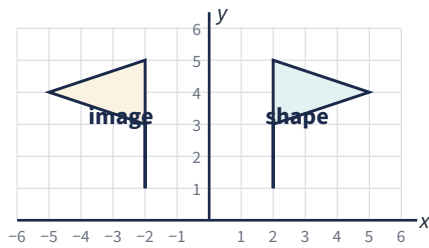
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Answer: _____

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- 4 Describe fully the single transformation that maps the shape onto the image. [2 marks]



Answer: _____

- 5 A rectangle has vertices $(-3, 2)$, $(4, 2)$, $(4, -1)$ and $(-3, -1)$. Find its area. [2 marks]

.....

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Answer: _____

- 6 Find the midpoint of $(-4, 2)$ and $(2, -6)$. [2 marks]

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Answer: _____

- 7 Rotate the point $(2, 5)$ by 90° clockwise about the origin. [2 marks]

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Answer: _____

- 8 Three vertices of a square are $(-2, 1)$, $(2, 1)$ and $(2, -3)$. Find the fourth vertex. [2 marks]

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Answer: _____

- 9 A translation maps $(3, -1)$ to $(-2, 4)$. Describe it, and find where it maps the origin. [2 marks]

.....

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Answer: _____

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- 10 Which transformations (translation, reflection, rotation) keep the size and shape of a figure? [3 marks]
Which one reverses the figure (makes a mirror image)?

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Answer:

C Reasoning *explain, justify and check*

/ 9 marks

- 1 Explain why reflecting in the x-axis changes only the sign of the y-coordinate. [2 marks]

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- 2 Show that rotating (3, 4) by 180° about O gives the same point as reflecting it in the x-axis and then in the y-axis. [3 marks]

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- 3 Ali plotted (2, -3) by going 2 down and 3 right. Explain his mistake. [2 marks]

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- 4 Explain why a translated shape always faces the same way as the original. [2 marks]

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D**Challenge** *multi-step and problem-solving*

/ 11 marks

- 1 A point is reflected in the y-axis, then translated 4 units right. It ends at (1, 3). Where did it start? [3 marks]

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Answer: _____

- 2 Rotate the triangle (1, 2), (4, 2), (1, 6) by 90° anticlockwise about the origin. List the image's vertices. [3 marks]

.....

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Answer: _____

- 3 ABCD is a parallelogram with A(-3, -1), B(2, -1) and C(4, 3). Find D. [3 marks]

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Answer: _____

- 4 Find the area of the triangle with vertices (-3, -2), (3, -2) and (0, 4). [2 marks]

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Answer: _____

How did I go?Fluency ____ / 16 Core ____ / 22 Reasoning ____ / 9 Challenge ____ / 11 **Total ____ / 58**

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