

WA7MMGTW8

Two-dimensional space and structures

Core + Challenge

The Cartesian Plane and Transformations — Marking Key

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

For tutors and parents. Award method marks for correct working even if the final answer is wrong.

Marks summary

Section A Fluency: 16 Section B Core: 22 Section C Reasoning: 9 Section D Challenge: 11 **Total: 58**

Fluency: 1 mark each; accept an equivalent unsimplified answer for half credit at tutor's discretion.

A Fluency *answers and working*

/ 16 marks

Q	Answer	Working
1	(3, 4)	across, then up/down
2	(-2, 5)	across, then up/down
3	(-4, -3)	across, then up/down
4	(5, -2)	across, then up/down
5	(0, -4)	across, then up/down
6	(-5, 0)	across, then up/down
7	second	$x < 0, y > 0$
8	fourth	$x > 0, y < 0$
9	(1, 1)	$(3 - 2, 4 - 3)$
10	(3, -4)	y changes sign
11	(-3, 4)	x changes sign
12	(-3, -4)	both signs change
13	(1, -3)	$(-4 + 5, -3)$
14	(-5, -2)	x changes sign
15	(2, 5)	$(x, y) \rightarrow (-y, x)$
16	6 units	$5 - (-1)$

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B

Core *answers, working and marks*

/ 22 marks

Q	Answer	Working / sample response	Marks
1	$(-4, 3), (-1, 3), (-4, 5)$	Subtract 5 from x, add 2 to y <i>1 mark per vertex</i>	3
2	$(2, -1), (5, -1), (2, -4)$	y changes sign <i>2 marks</i>	2
3	$(-1, -1), (-3, -1), (-3, -3), (-1, -3)$	Both coordinates change sign <i>2 marks</i>	2
4	Reflection in the y-axis	Each point $(x, y) \rightarrow (-x, y)$ <i>1 mark: reflection</i> <i>1 mark: y-axis</i>	2
5	21 square units	7 across $\times$ 3 up <i>1 mark: 7 and 3</i> <i>1 mark: 21</i>	2
6	$(-1, -2)$	Average the x values and the y values <i>1 mark each coordinate</i>	2
7	$(5, -2)$	$(x, y) \rightarrow (y, -x)$ <i>2 marks</i>	2
8	$(-2, -3)$	Side length 4 <i>2 marks</i>	2
9	5 left, 5 up; $(-5, 5)$	x: -5, y: +5 <i>1 mark each</i>	2
10	All three; reflection	They are all isometries (same size and shape) Only a reflection flips the orientation <i>1 mark: all</i> <i>2 marks: reflection explained</i>	3

C

Reasoning *sample answers and marking criteria*

/ 9 marks

Q	Answer	Working / sample response	Marks
1	The distance across stays the same	The point moves straight up or down to the same distance on the other side of the x-axis. <i>2 marks</i>	2
2	$(-3, -4)$ both ways	$(3, 4) \rightarrow (3, -4) \rightarrow (-3, -4)$ Rotation: $(-3, -4)$ <i>1 mark each step</i>	3
3	He swapped x and y	x comes first: 2 right, then 3 down. <i>2 marks</i>	2

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Q	Answer	Working / sample response	Marks
4	Every point moves the same amount in the same direction	No turning or flipping happens. <i>2 marks</i>	2

D

Challenge *solutions and marking criteria*

/ 11 marks

Q	Answer	Working / sample response	Marks
1	(3, 3)	Undo in reverse: 4 left $\rightarrow$ (-3, 3) Reflect $\rightarrow$ (3, 3) <i>1 mark: reverse order</i> <i>1 mark: (-3, 3)</i> <i>1 mark: (3, 3)</i>	3
2	(-2, 1), (-2, 4), (-6, 1)	(x, y) $\rightarrow$ (-y, x) <i>1 mark per vertex</i>	3
3	(-1, 3)	AB moves 5 right, so DC must too D = C moved 5 left <i>1 mark: idea</i> <i>2 marks: (-1, 3)</i>	3
4	18 square units	base 6, height 6; $\frac{1}{2} \times 6 \times 6$ <i>1 mark: base, height</i> <i>1 mark: 18</i>	2