

WA6MMGTW5

Two-dimensional space and structures

Core + Challenge

The Cartesian Plane — Marking Key

I can use coordinates to read, plot and move points in all four quadrants of the Cartesian plane.

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

Marks summary

A Warm up: 16 B Practise: 23 C Think it through: 10 D Challenge: 9 **Total: 58**

Gold shading in this key shows what the child should have shaded or drawn. Accept any correct arrangement unless the question fixes it.

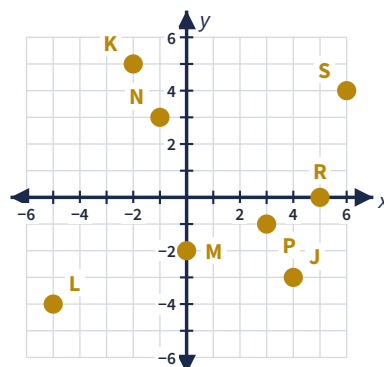
A

Warm up *answers*

/ 16 marks

Q	Answer	Model answer / notes	Marks
1	(3, 5)	From (0, 0): 3 right, then 5 up. 1st quadrant.	1
2	(-5, 2)	From (0, 0): 5 left, then 2 up. 2nd quadrant.	1
3	(-3, -4)	From (0, 0): 3 left, then 4 down. 3rd quadrant.	1
4	(2, -5)	From (0, 0): 2 right, then 5 down. 4th quadrant.	1
5	(0, 4)	From (0, 0): 0 across, then 4 up. On the y-axis.	1
6	(-4, 0)	From (0, 0): 4 left, then 0 up or down. On the x-axis.	1
7	(5, -2)	From (0, 0): 5 right, then 2 down. 4th quadrant.	1
8	(-6, -3)	From (0, 0): 6 left, then 3 down. 3rd quadrant.	1

9 J at (4, -3)



1

From (0, 0): 4 right, then 3 down. 4th quadrant. All eight points are shown on the grid.

10	K at (-2, 5)	From (0, 0): 2 left, then 5 up. 2nd quadrant.	1
11	L at (-5, -4)	From (0, 0): 5 left, then 4 down. 3rd quadrant.	1

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Q	Answer	Model answer / notes	Marks
12	M at (0, -2)	From (0, 0): 0 across, then 2 down. On the y-axis.	1
13	N at (-1, 3)	From (0, 0): 1 left, then 3 up. 2nd quadrant.	1
14	P at (3, -1)	From (0, 0): 3 right, then 1 down. 4th quadrant.	1
15	R at (5, 0)	From (0, 0): 5 right, then 0 up or down. On the x-axis.	1
16	S at (6, 4)	From (0, 0): 6 right, then 4 up. 1st quadrant.	1

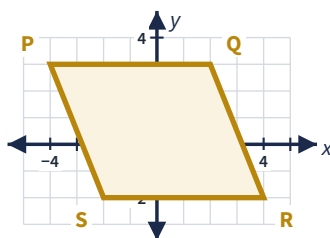
B

Practise *answers and working*

/ 23 marks

Q	Answer	Working / sample response	Marks
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1 Parallelogram



PQ and SR are both 6 units long and horizontal, so they are parallel and equal.

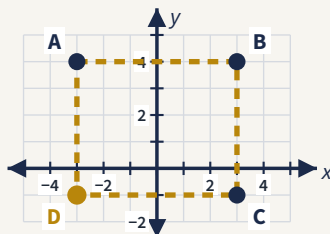
PS and QR both go 2 right and 5 down, so they are parallel too. The corners are not right angles, so it is a parallelogram (not a rectangle).

2

1 mark: all four points plotted and joined correctly.

1 mark: parallelogram.

2 D (-3, -1)



D is straight below A (same x-coordinate, -3) and level with C (same y-coordinate, -1).

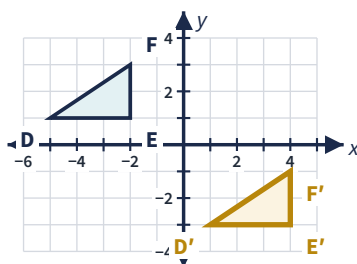
So D = (-3, -1).

2

1 mark: D = (-3, -1).

1 mark: reason, e.g. D is below A and level with C (or a correct sketch).

3
D' (1, -3)
E' (4, -3)
F' (4, -1)



Add 6 to each x-coordinate and subtract 4 from each y-coordinate.

D (-5, 1) → D' (1, -3)

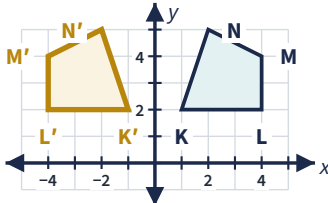
E (-2, 1) → E' (4, -3)

F (-2, 3) → F' (4, -1)

3

1 mark: triangle drawn in the correct place.

2 marks: all three coordinates correct (1 mark for two).

Q	Answer	Working / sample response	Marks																				
4	$K' (-1, 2)$ $L' (-4, 2)$ $M' (-4, 4)$ $N' (-2, 5)$	 Reflecting in the y-axis keeps each y-coordinate and changes the sign of the x-coordinate. $K (1, 2) \rightarrow K' (-1, 2)$ $L (4, 2) \rightarrow L' (-4, 2)$ $M (4, 4) \rightarrow M' (-4, 4)$ $N (2, 5) \rightarrow N' (-2, 5)$	3																				
1 mark: shape drawn as a mirror image in the correct place. 2 marks: all four coordinates correct (1 mark for two or three).																							
5	See table	<table><thead><tr><th>Point</th><th>x</th><th>y</th><th>Quadrant</th></tr></thead><tbody><tr><td>$(-7, 2)$</td><td>-</td><td>+</td><td>2nd</td></tr><tr><td>$(3, -8)$</td><td>+</td><td>-</td><td>4th</td></tr><tr><td>$(12, 6)$</td><td>+</td><td>+</td><td>1st</td></tr><tr><td>e.g. $(-4, -9)$</td><td>-</td><td>-</td><td>3rd</td></tr></tbody></table> $(-7, 2)$: x is -, y is +, so 2nd quadrant. $(3, -8)$: x is +, y is -, so 4th quadrant. $(12, 6)$: x is +, y is +, so 1st quadrant. Any point with both coordinates negative, e.g. $(-4, -9)$. 2 marks: all three given points correct (1 mark for two). 1 mark: a correct 3rd-quadrant point of their own.	Point	x	y	Quadrant	$(-7, 2)$	-	+	2nd	$(3, -8)$	+	-	4th	$(12, 6)$	+	+	1st	e.g. $(-4, -9)$	-	-	3rd	3
Point	x	y	Quadrant																				
$(-7, 2)$	-	+	2nd																				
$(3, -8)$	+	-	4th																				
$(12, 6)$	+	+	1st																				
e.g. $(-4, -9)$	-	-	3rd																				
6	a) 700 m b) 500 m	a) Same y-coordinate, so the path is horizontal: from -3 to 0 is 3 units, and from 0 to 4 is 4 units. $3 + 4 = 7$ units = 700 m. b) Same x-coordinate, so the path is vertical: from 2 down to 0 is 2 units, and from 0 down to -3 is 3 units. $2 + 3 = 5$ units = 500 m. 1 mark: 700 m. 1 mark: 500 m. (Accept 7 units and 5 units for 1 mark in total.)	2																				
7	a) (1, 3) b) Salmon Bay c) 4 left, 3 up (either order)	a) Georgie Bay: 1 right, 3 up = (1, 3). b) Thomson Bay (5, -2): 7 left $\rightarrow$ (-2, -2), then 1 down $\rightarrow$ (-2, -3) = Salmon Bay. c) Salmon Bay (-2, -3) to West End (-6, 0): x goes from -2 to -6 (4 left), y goes from -3 to 0 (3 up). 1 mark for each part. In c) accept the moves in either order (4 left, 3 up or 3 up, 4 left).	3																				
8	$y = x - 2$	<table><thead><tr><th>x</th><th>-2</th><th>-1</th><th>0</th><th>1</th><th>2</th><th>3</th><th>10</th></tr></thead><tbody><tr><th>y</th><td>-4</td><td>-3</td><td>-2</td><td>-1</td><td>0</td><td>1</td><td>8</td></tr></tbody></table> Missing y-values: $x = 0 \rightarrow -2$, $x = 1 \rightarrow -1$, $x = 3 \rightarrow 1$, $x = 10 \rightarrow 8$. Each y-coordinate is 2 less than its x-coordinate ($y = x - 2$). 1 mark: -2, -1 and 1 correct. 1 mark: 8 for $x = 10$. 1 mark: the rule in words or symbols.	x	-2	-1	0	1	2	3	10	y	-4	-3	-2	-1	0	1	8	3				
x	-2	-1	0	1	2	3	10																
y	-4	-3	-2	-1	0	1	8																

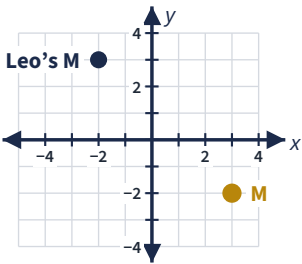
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Q	Answer	Working / sample response	Marks
9	$P = 28 \text{ m}$, $A = 45 \text{ m}^2$	Length: from $x = -4$ to $x = 5$ is $4 + 5 = 9 \text{ m}$. Width: from $y = -2$ to $y = 3$ is $2 + 3 = 5 \text{ m}$. Perimeter = $9 + 5 + 9 + 5 = 28 \text{ m}$. Area = $9 \times 5 = 45 \text{ m}^2$. <i>1 mark: perimeter 28 m.</i> <i>1 mark: area 45 m².</i>	2

C

Think it through *sample answers and criteria*

/ 10 marks

Q	Answer	Working / sample response	Marks
1	No: he swapped x and y	 Leo went 2 left and 3 up, which is $(-2, 3)$. He swapped the two numbers: he used -2 across and 3 up. $M(3, -2)$ is 3 right, then 2 down, in the 4th quadrant. <i>1 mark: explains that x (across) comes first, or that he swapped the coordinates.</i> <i>1 mark: M plotted at $(3, -2)$.</i>	2
2	False	The x-coordinate is 0, so the point is not left or right of the origin: it sits on the y-axis, 3 below the origin. Points on an axis are not in any quadrant. <i>1 mark: False.</i> <i>1 mark: explains that $(0, -3)$ lies on the y-axis (between the 3rd and 4th quadrants).</i>	2
3	Sometimes	$(-2, 3)$ is in the 2nd quadrant, so it can be true. $(-2, -3)$ is in the 3rd quadrant and $(-2, 0)$ is on the x-axis, so it is not always true. <i>1 mark: Sometimes.</i> <i>1 mark: one example in the 2nd quadrant and one that is not.</i>	2
4	$(-2, 3)$	$(3, -2)$, $(5, -7)$ and $(1, -1)$ all have a positive x and a negative y, so they are in the 4th quadrant. $(-2, 3)$ is the only point in the 2nd quadrant. <i>1 mark: chooses $(-2, 3)$.</i> <i>1 mark: explanation using signs or quadrants. Accept another choice only with a correct, clear reason.</i>	2

5

See table

	y is positive	y is negative
x is positive	(4, 2), (1, 7)	(2, -2), (6, -3)
x is negative	(-3, 5), (-5, 1)	(-1, -6), (-2, -2)

2

Each box matches one quadrant: top left = 1st, top right = 4th, bottom left = 2nd, bottom right = 3rd.

1 mark: all eight points sorted correctly (accept seven).

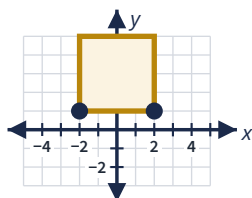
1 mark: notices each box is one quadrant.

D Challenge *solutions and criteria*

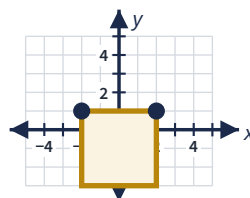
/ 9 marks

Q Answer Working / sample response Marks

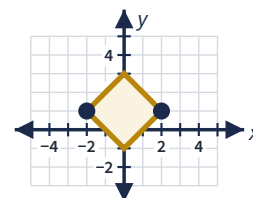
1



2



3



- 1** 1: $(-2, 5), (2, 5)$
2: $(-2, -3), (2, -3)$
3: $(0, 3), (0, -1)$

The points are 4 units apart. If they are next to each other, the square has sides of 4 units and can go up or down.

Up: $(-2, 5)$ and $(2, 5)$. Down: $(-2, -3)$ and $(2, -3)$.

If they are opposite corners (a diagonal), the middle is $(0, 1)$ and the other corners are 2 above and 2 below it: $(0, 3)$ and $(0, -1)$.

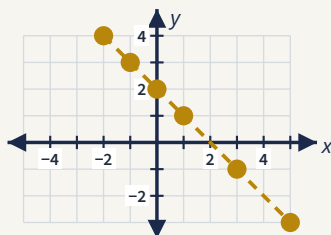
1 mark for each correct square (both corners); there are exactly 3.

The diagonal (tilted) square is the hardest to find.

3

2

Points lie on a straight line



For example $(-2, 4), (-1, 3), (0, 2), (1, 1), (3, -1), (5, -3)$.

They lie on a straight line sloping down to the right.

In the 3rd quadrant both coordinates are negative, and two negative numbers add to a negative number, never 2.

3

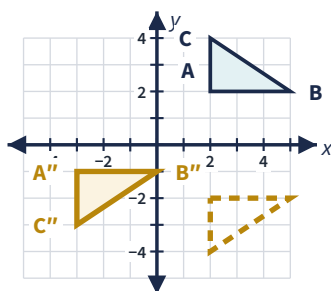
1 mark: five correct points including one in the 2nd and one in the 4th quadrant.

1 mark: plotted and notices they form a straight line.

1 mark: explains that two negatives cannot add to 2.

3

- a) $A''(-3, -1)$
 $B''(0, -1)$
 $C''(-3, -3)$
b) No



Start	Reflect	Translate
A (2, 2)	$(2, -2)$	$(-3, -1)$
B (5, 2)	$(5, -2)$	$(0, -1)$
C (2, 4)	$(2, -4)$	$(-3, -3)$

a) Reflect in the x-axis (change the sign of y): $(2, -2), (5, -2), (2, -4)$.

Then 5 left, 1 up: $(-3, -1), (0, -1), (-3, -3)$.

b) Translate first: $(-3, 3), (0, 3), (-3, 5)$.

Then reflect: $(-3, -3), (0, -3), (-3, -5)$.

Emma's triangle is 2 units lower, so she does not end up in the same place.

1 mark: reflected corners correct.

1 mark: final corners correct.

1 mark: No, with Emma's coordinates or a clear reason.

3