

WA6MMGTW5

Two-dimensional space and structures

Core + Challenge

The Cartesian Plane

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

Name: _____ Date: _____ Score: _____ / 58

Key idea

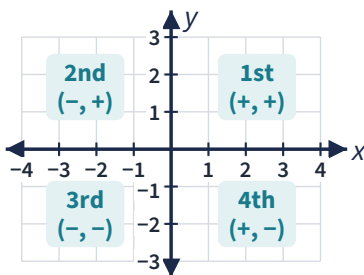
The **x-axis** and the **y-axis** are two number lines that cross at zero. This point is the **origin**, (0, 0).

For **(x, y)**, start at the origin. Go **across first** (right +, left -), **then up or down** (up +, down -).

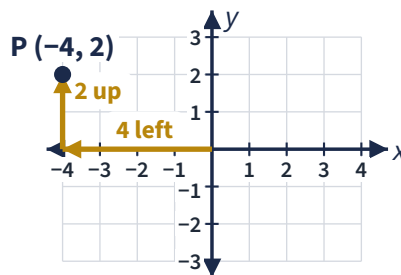
The axes make **four quadrants**, numbered anticlockwise. A point on an axis is in no quadrant.

Example: P (-4, 2) is **4 left**, then **2 up**. P is in the 2nd quadrant.

The four quadrants



Plotting P (-4, 2)

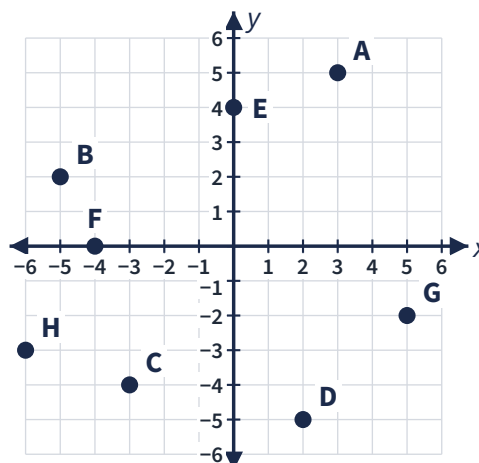


A

Warm up *read, plot and write*

/ 16 marks

Write the coordinates of each point on the grid. 1 mark each.



1 A (____, ____)

2 B (____, ____)

3 C (____, ____)

4 D (____, ____)

5 E (____, ____)

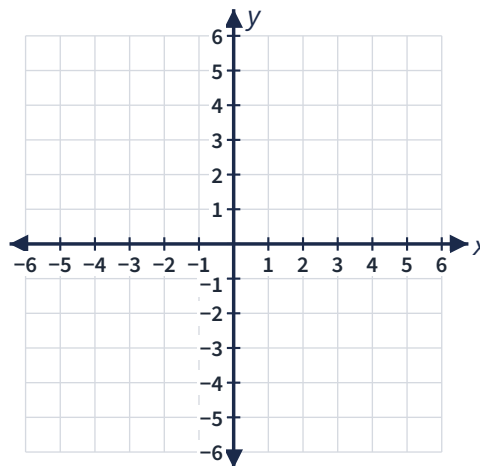
6 F (____, ____)

7 G (____, ____)

8 H (____, ____)

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Plot each point on the grid below. Mark it with a small cross and write its letter. 1 mark each.

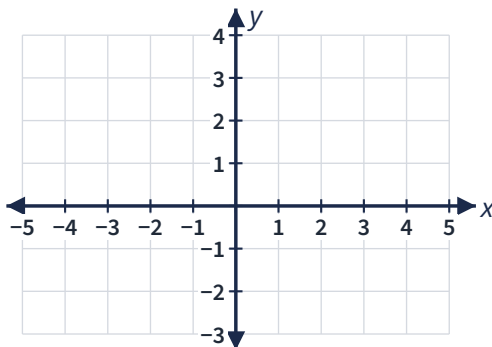


- | | | | |
|--------------------------|--------------------------|---------------------------|--------------------------|
| 9 Plot J (4, -3) | 10 Plot K (-2, 5) | 11 Plot L (-5, -4) | 12 Plot M (0, -2) |
| 13 Plot N (-1, 3) | 14 Plot P (3, -1) | 15 Plot R (5, 0) | 16 Plot S (6, 4) |

B Practise *use the skill*

/ 23 marks

- 1 Plot the points **P** (-4, 3), **Q** (2, 3), **R** (4, -2) and **S** (-2, -2). Join them in order $P \rightarrow Q \rightarrow R \rightarrow S \rightarrow P$. Name the shape you have made. [2 marks]



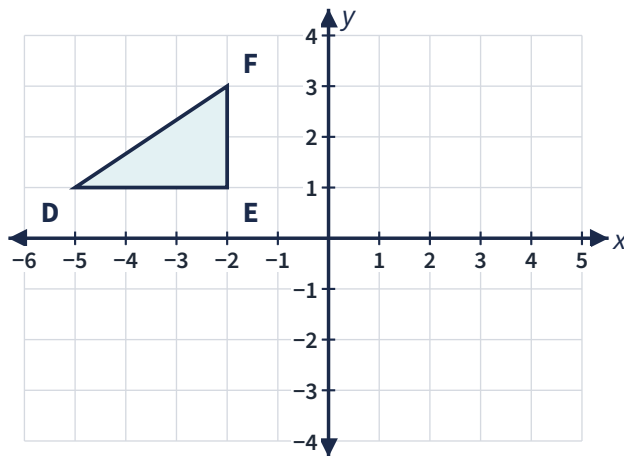
Shape: _____

- 2 **A** (-3, 4), **B** (3, 4) and **C** (3, -1) are three corners of a **rectangle** ABCD. What are the coordinates of the fourth corner, D? Explain how you know. (A quick sketch may help.) [2 marks]

D = (_____ , _____)

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- 3 Translate triangle DEF **6 units right** and **4 units down**. Draw the new triangle D'E'F' and write the coordinates of its corners. [3 marks]

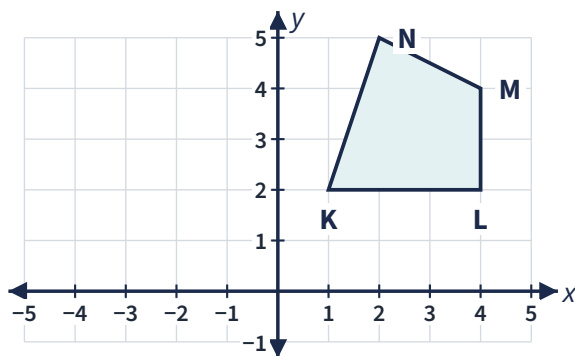


D' (_____ , _____)

E' (_____ , _____)

F' (_____ , _____)

- 4 Reflect shape KLMN in the **y-axis**. Draw the reflected shape K'L'M'N' and write the coordinates of its corners. [3 marks]



K' (_____ , _____)

L' (_____ , _____)

M' (_____ , _____)

N' (_____ , _____)

- 5 These points are too far out to fit on a grid, but the signs tell you where they are. Complete the table. In the last row, make up your own point. [3 marks]

Point	Sign of x (+ or -)	Sign of y (+ or -)	Quadrant
(-7, 2)			
(3, -8)			
(12, 6)			
			3rd

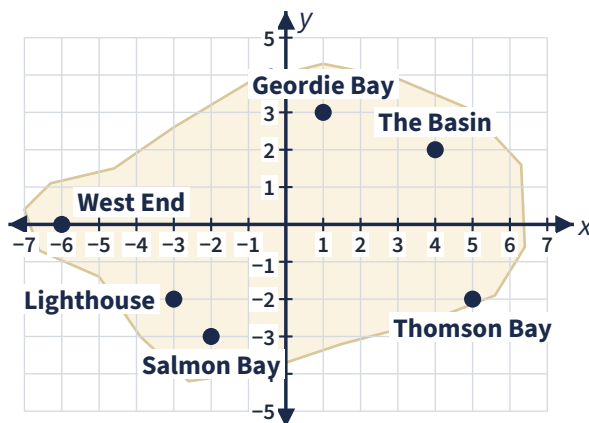
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- 6 On a map of Kings Park, the café is at $(-3, 2)$, the playground is at $(4, 2)$ and the lookout is at $(4, -3)$. Each unit on the map is **100 m**. **a)** How far is it from the café to the playground? **b)** How far is it from the playground to the lookout? [2 marks]

a) _____

b) _____

- 7 Mia explores **Rottnest Island (Wadjemup)** by bike (map not to scale). **a)** Write the coordinates of Georgie Bay. **b)** Mia starts at Thomson Bay and rides 7 units left, then 1 unit down. Where is she now? **c)** Describe the move from Salmon Bay to the West End. [3 marks]



a) _____

b) _____

c) _____

- 8 These points all lie on a straight line and follow a pattern. Complete the table, then describe the rule that connects each y-coordinate to its x-coordinate. [3 marks]

x	-2	-1	0	1	2	3	10
y	-4	-3			0		

Rule: _____

- 9 A school vegetable garden is a rectangle with corners at $(-4, 3)$, $(5, 3)$, $(5, -2)$ and $(-4, -2)$. Each unit is **1 metre**. Find the **perimeter** and the **area** of the garden. [2 marks]

Working: _____

Perimeter: _____

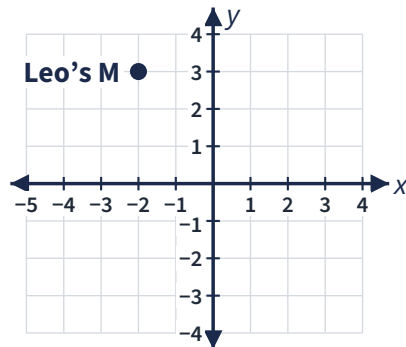
Area: _____

C

Think it through *explain your thinking*

/ 10 marks

- 1 Leo was asked to plot the point **M (3, -2)**. He put his dot where it is shown. Do you agree with Leo? Explain his mistake, then plot M in the correct place. [2 marks]



- 2 **True or false?** “The point (0, -3) is in the 4th quadrant.” Explain how you know. You may draw a sketch. [2 marks]

- 3 **Always, sometimes or never true?** “A point with a negative x-coordinate is in the 2nd quadrant.” Circle one and give examples to show why. [2 marks]

- 4 Which point is the **odd one out**? (3, -2), (5, -7), (-2, 3), (1, -1) Explain your choice. [2 marks]

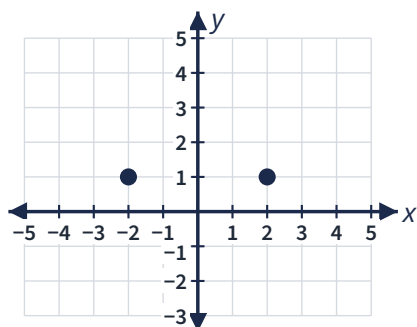
- 5 Sort these points into the table: (4, 2), (-3, 5), (-1, -6), (2, -2), (-5, 1), (6, -3), (-2, -2), (1, 7). What do you notice about each box? [2 marks]

	y is positive	y is negative
x is positive		
x is negative		

D Challenge *stretch yourself*

/ 9 marks

- 1 $(-2, 1)$ and $(2, 1)$ are two corners of a **square**. How many different squares could be drawn? Draw them all and write the other two corners of each. [3 marks]



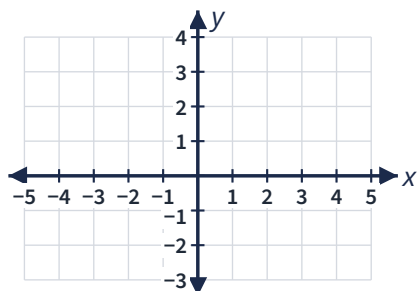
Square (____ , ____) (____ , ____)

Square (____ , ____) (____ , ____)

Square (____ , ____) (____ , ____)

Square (____ , ____) (____ , ____)

- 2 Find **five** points whose x- and y-coordinates **add to 2**, like $(1, 1)$. Include one in the 2nd quadrant and one in the 4th. Plot them. What do you notice? Why can none of these points be in the **3rd** quadrant? [3 marks]

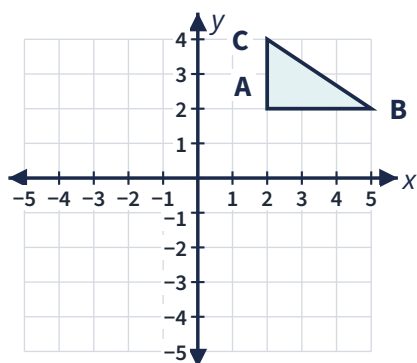


My points: _____

I notice: _____

Never 3rd because: _____

- 3 a) Reflect triangle ABC in the **x-axis**, then translate it **5 left** and **1 up**. Draw both and fill in the table. b) Emma does the moves in the opposite order. Does she end up in the same place? Show how you know. [3 marks]



Start	After reflecting	After translating
A (2, 2)		
B (5, 2)		
C (2, 4)		

b) _____

How did I go?

Warm up ____ / 16 Practise ____ / 23 Think it through ____ / 10 Challenge ____ / 9 **Total ____ / 58**

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