

5.7 The Cartesian plane

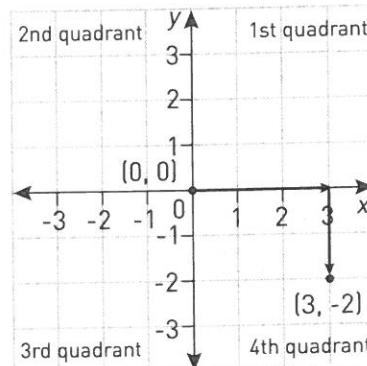
The **Cartesian plane** is a grid that has two intersecting number lines called the **x-axis** (horizontal) and the **y-axis** (vertical). Any position on the plane can be shown using a pair of coordinates. A pair of coordinates has an **x-value** (always written first) and a **y-value**. It is also called an **ordered pair** (x, y) .

Plotting an ordered pair

e.g. Plot $(3, -2)$.

- 1 Start at $O(0, 0)$. This is the **origin**.
- 2 Look at the **x-value** $(3, -2)$. Move right 3 units.
- 3 Look at the **y-value** $(3, -2)$. Move down 2 units.
- 4 Mark the position and write the ordered pair next to the point.

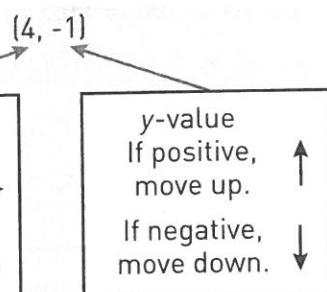
The point $(3, -2)$ is in the 4th quadrant.



Word Bank

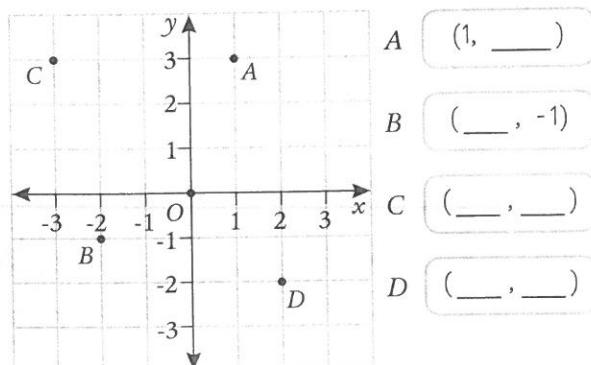
Ordered pair

→ An **x-value** and a **y-value** used to describe an exact position on a Cartesian plane is called an **ordered pair**. It is in the form (x, y) . The **x-value** is always stated first.

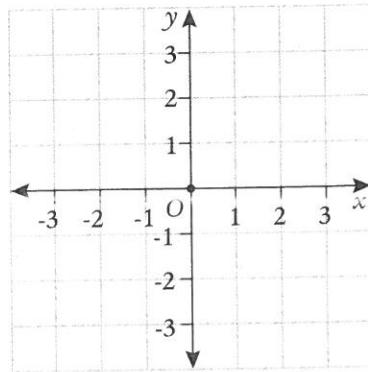


- 1 Write the **coordinates** of the points on the Cartesian plane.

Tip The **x-value** is written first in an ordered pair.



- 2 Starting at $(0, 0)$, state the ordered pair for the following positions.

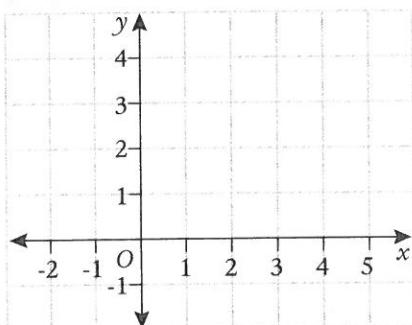


- a Move 1 unit right and 3 units up.
 $(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$
- b Move 3 units right and no units up or down. (This point is on the **x-axis**).
 $(\underline{\hspace{1cm}}, 0)$
- c Move 2 units left and 1 unit up.
 $(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$
- d Move no units left or right and 3 units down. (This point is on the **y-axis**).
 $(0, \underline{\hspace{1cm}})$

- 3** Plot and label these points on the Cartesian plane below.

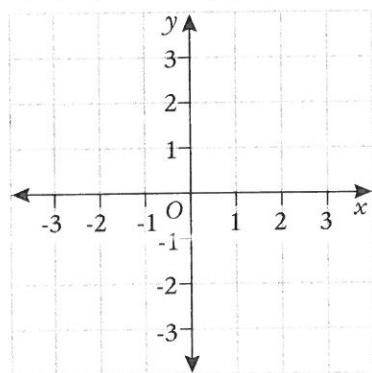
Tip Start at $(0, 0)$ and 'walk before you jump'. Walk to the x -value left or right and then jump up or down to the y -value.

- a $(4, 2)$ b $(-2, 0)$ c $(-2, 3)$



- 4** a Plot the following points and join them with a straight line.

A $(-1, -3)$ B $(0, -1)$ C $(2, 3)$



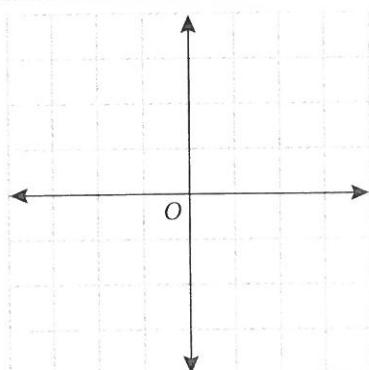
- b State the coordinates of another point that lies on the line.

(____, ____)

- 5** a Draw a Cartesian plane from -3 to 3 on both axes.

Tip Cartesian plane 'must dos':

- 1 Use a ruler to rule the axes.
- 2 Space the numbers evenly on the axes.
- 3 Label the x - and y -axes.

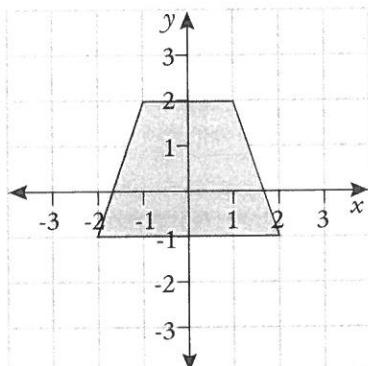


- b Join the points in order.

Start at $(2, 1)$. Join $(2, 1) \rightarrow (0, 3) \rightarrow (-2, 1) \rightarrow (-1, -2) \rightarrow (1, -2) \rightarrow (2, 1)$.

- c What shape is created?

- 6** Look at the Cartesian plane below.



- a Label the ordered pair at each vertex (point) of the shape on the Cartesian plane above.

- b Write a list of instructions using ordered pairs to draw the shape above.

Start at (____, ____). Join (____, ____) \rightarrow (____, ____) \rightarrow (____, ____).

- c What shape is drawn on the Cartesian plane in part a?

NAPLAN-ready

Shade the box beneath the correct answer.

On a Cartesian plane, an ant is sitting at $(3, 4)$. It sees a drop of honey at $(0, 4)$ and walks in a direct line to it.

In which direction did the ant walk to reach the honey?

Right Left Up Down

Tip Which number in the ordered pair has changed—the x or the y ? Has the changed number gone up or down?