WALT
Success Criteria

E The number plane

The **number plane**, also referred to as a **Cartesian plane**, consists of four **quadrants**. Two number lines, the **x-axis** and **y-axis**, intersect at right angles to form the number plane.

Coordinate numbers are used to locate a point in the number plane.
- The **horizontal** (x) position of the point is given first.
- The **vertical** (y) position of the point is given second.

Each quadrant contains coordinates that are specific to that quadrant. For example, in the 1st quadrant both the x- and y-coordinates are positive.

So the point at (3, 4), where x and y are both positive, must be in the first quadrant.
- '3' is first, so it gives the horizontal (x) position.
- '4' is second, so it gives the vertical (y) position.
The intersection of the x and y values is where the point (3, 4) lies.

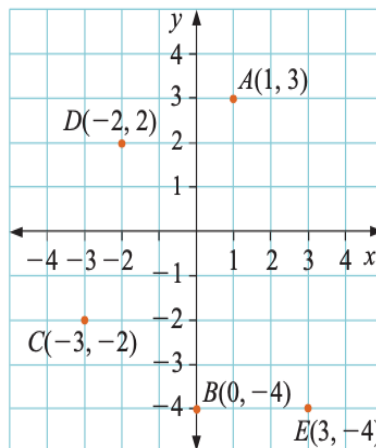The point (0, 0) in the middle, where the axes intersect, is called the **origin**.
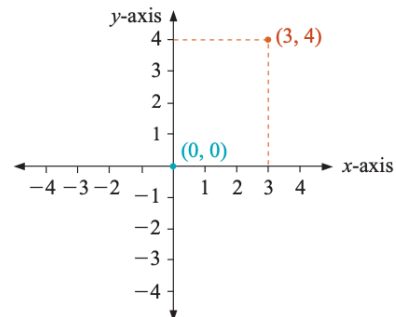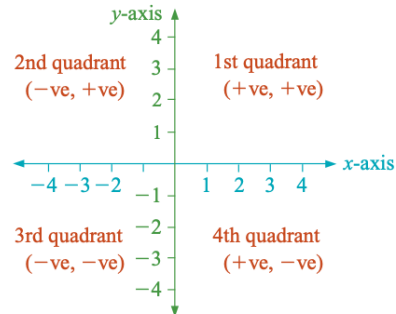
EXAMPLE 1

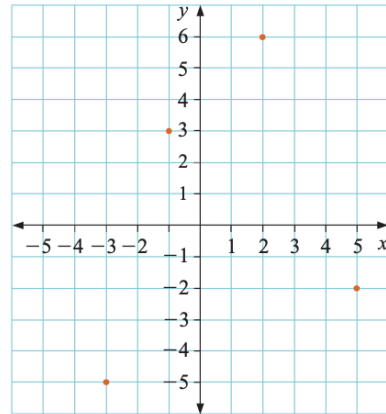Plot points $A(1, 3)$, $B(0, -4)$, $C(-3, -2)$, $D(-2, 2)$ and $E(3, -4)$ on a number plane.


Don't forget to label the axes.

1 Copy the number plane and label the following points.

$A(-3, -5)$ $B(2, 6)$ $C(5, -2)$ $D(-1, 3)$

2 Plot the following points on a number plane.

$E(1, 1)$ $F(-2, -5)$ $G(0, 2)$ $H(-3, 0)$

3 Plot the following points on a number plane.

$I(3, -5)$ $J(4, 0)$ $K(4, 2)$ $L(-4, 5)$

4 Plot the following points on a number plane.

$M(0, -2)$ $N(4, 4)$ $O(0, 0)$
$P(-3, -2)$ $Q(-5, 2)$ $R(-5, -5)$
$S(-1, 3)$ $T(-1, 2)$ $U(2, -5)$

5 Complete each sentence by correctly inserting 'positive' or 'negative'.

a   **i**   In the 1st quadrant, the x-coordinate is _____ and the y-coordinate is _____.

    ii   Give four examples of points that could lie in the 1st quadrant.

b   **i**   In the 2nd quadrant, the x-coordinate is _____ and the y-coordinate is _____.

    ii   Give four examples of points that could lie in the 2nd quadrant.

c   **i**   In the 3rd quadrant, the x-coordinate is _____ and the y-coordinate is _____.

    ii   Give four examples of points that could lie in the 3rd quadrant.

d   **i**   In the 4th quadrant, the x-coordinate is _____ and the y-coordinate is _____.

    ii   Give four examples of points that could lie in the 4th quadrant.

6 Eight points have been plotted on this number plane.

   a Write the coordinates of each point.

   b Name two points with the same x-coordinate. What do you notice about their positions on the number plane?

   c Name two points with the same y-coordinate. What do you notice about their positions on the number plane?

   d Name two points with the x-coordinate equal to the y-coordinate. What do you notice about their positions on the number plane?
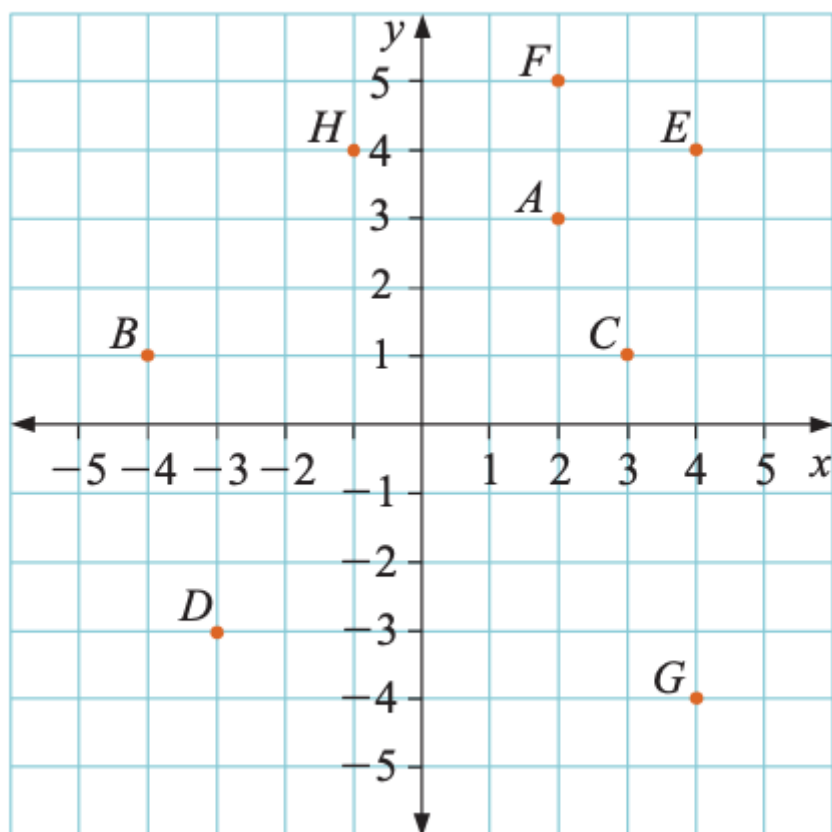
7 Write the coordinates of the letters A to Z shown on the number plane; for example, $A(-5, 5)$.

8 a Plot points $A(-3, 3)$, $B(1, 3)$ and $C(1, -1)$ on a number plane.

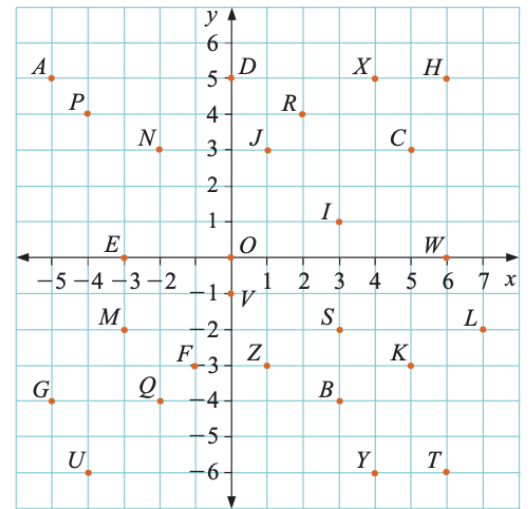**b** If $ABCD$ is a square, find the coordinates of point D.

9 a Plot points $P(-4, 0)$, $Q(-4, 5)$ and $R(3, 5)$ on a number plane.

b If $PQRS$ is a rectangle, find the coordinates of point S.

10 a Plot points $A(-3, -2)$, $B(-2, -1)$, $C(-1, 0)$, $D(0, 1)$ and $E(1, 2)$ on the same number plane. Join the points.

b What do you notice?

c What are the coordinates of the next three points, F, G and H, if the pattern continues?

11 a Plot points $A(5, 3)$, $B(4, 2)$, $C(3, 1)$, $D(2, 0)$ and $E(1, -1)$ on the same number plane. Join the points.

b What are the next three points, F, G and H, if the pattern continues?