# Position

## What do you need to know?

The term **position** refers to the place where something is. However, to understand what position refers to in mathematics, we need to define some other things first:

Firstly, a **grid** is a base made up of lots of little squares that we use to split our 2D space.

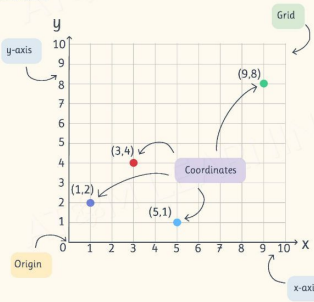
Alongside the grid we always have two **axes.** The horizontal axis is the line that runs along the bottom of the grid. This is called the **x-axis**. The vertical axis is the one that runs up the side. This is called the **y-axis.** The grid splits the axes into small intervals.

Along both the x axis and the y axis will be numbers in order, starting with 0 at the point where the x and y axis meet. This is called the **origin.**

Using the axes we can refer to points in the grid by indicating their **coordinates**. **Coordinates** will be made up of two digits - surrounded by brackets and with a comma in between. For example the coordinates of the **origin** are (0,0).

The first digit will tell us how far to the right in the x-axis we need to go (how many intervals we need to count to the right). The second digit will tell us how far up in the y-axis we have to go (how many intervals we need to count upwards).

In mathematics, we can know the **position** of a point or an object if we know its **coordinates!**




For example the position of the purple, red and blue points on this grid are, (1 , 2) (3 , 4) and (5, 1) respectively.

When you read or plot coordinates, the first number will always refer to the x-axis and is read first, followed by the y axis. So if you see a coordinate looking like this (9,8)

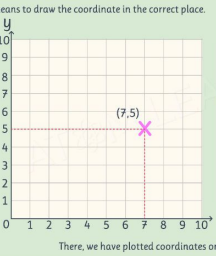
⭐ The 9 refers to the x-axis because this is first,

⭐ The 8 refers to the y-axis because it is second!

You can see (9,8) on the grid above marked with a green dot.

## Plotting Coordinates:

Sometimes you will be asked to plot some coordinates onto the grid. **Plotting** just means to draw the coordinate in the correct place.




Let's say the coordinates that we need to plot are (7,5)

Begin by counting along the x-axis to 7, or just finding that number 7. Then we find the 5 on the y-axis. Run your fingers along to find the correct place. Make a mark.

There, we have plotted coordinates onto a grid! Hooray!

## Let's see how this works in an example!

Inés has a treasure map. She thinks that the red cross indicates where the treasure is buried. She wants to describe this position to her pirate friend using coordinates.

**What are the coordinates of the cross?**


Remember we always read the **x-axis first** so run your finger down to see which number is it. That's right, it's 4!

Now go back to the X and run your finger along to the edge of the **y-axis**. That's right, it's 3. So the coordinates are 4 and 3!

x-axis = 4

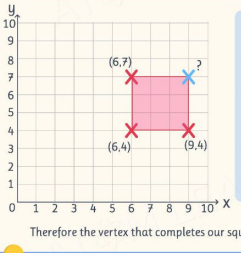
y-axis = 3

We would write this as (4,3). Now Inés can tell her pirate friend where to find the treasure!

## Let's look at a different example:

Amy is trying to plot a square onto the grid below, but she has only been given the coordinates for 3 of the vertices! The coordinates of three of the vertices of a square are (6,4) (9,4) (6,7). **What are the coordinates of the fourth vertex?**

In order to find the last coordinate we will plot the three coordinates that we have been given! Remember the first number always refers to the x-axis and the second number to the y axis.




A square is a quadrilateral whose sides are all **equal** in length, so we know that the last point must be the one marked by the blue X. If we run our finger across the x-axis to align it with the cross we see that the x-coordinate is the number 9. If from here we run our finger upwards to meet the cross we will see that the y-coordinate is 7!

Therefore the vertex that completes our square has coordinates (9, 7)!

## Remember!

⭐ x is the horizontal axis and y is the vertical one. x to the right y to the sky!

⭐ When writing the digits in a coordinate remember to write the x-axis first and then the y-axis. You go along the hallway and then up the stairs!