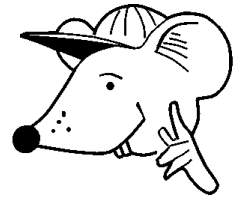




MATHEMATICS



N.S. Yr. 4 P.108

**Recognise positions and directions,
and use co-ordinates.**

Equipment

Paper, pencil, ruler, magnetic compass, simple maps.

MathSphere

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Concepts

Children should be familiar with all the words from previous modules plus the following and should be able to use, read and write them:

position, direction, ascend, descend, journey, route, map, plan, grid, row, column, origin, co-ordinates, compass, point, north, south, east, west, north-east, north-west, south-east, south-west, horizontal, vertical, diagonal.

Co-ordinates from now on are numbered on the **lines** on both axes, not in the spaces. The reason for this is that it prepares the way for the later use of fractional co-ordinates such as (3.2, 4.8) to give greater resolution and access to more points on the grid.

The origin is the point (0,0). It is an unbreakable rule that when giving the position of a point as a set of co-ordinates, the **first** number refers to the distance from the origin **horizontally** and the **second** the distance from the origin **vertically**. The point (3,2) is therefore different to the point (2,3).

In the context of a grid, children should understand that horizontal means across the grid from left to right and vertical means across the grid from towards you to away from you.

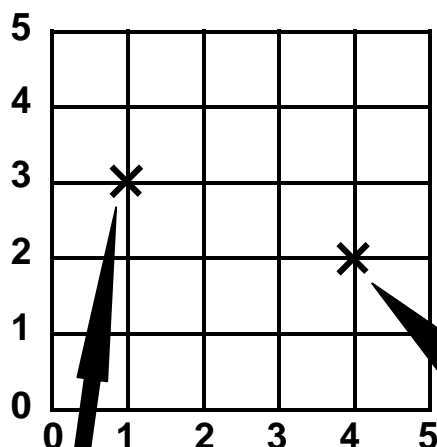
In the context of real life, they should understand that horizontal means a line or surface that is parallel to the horizon and vertical means a line or surface going straight up (at right angles to the horizon).

Remember that columns are vertical (old Greek buildings) and rows are horizontal (cinema seats).

Children should now have a good grasp of N, S, E and W and should be extending this to North-east, North-west, South-east and South-west.

Use maps on journeys (or to plan a journey) whenever possible.

The most important thing about co-ordinates!!



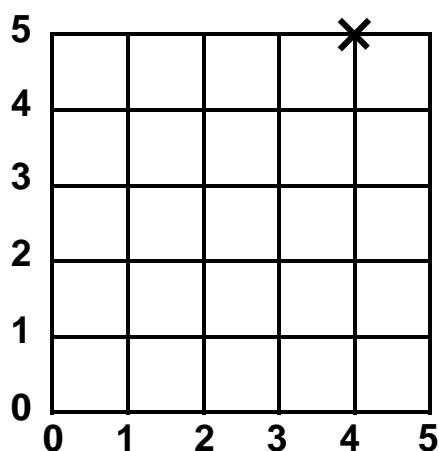
When you plot points on a grid, remember the **first** number is the number of squares along and the **second** number is the number of squares up.

This is very important!!!

This point is (4,2),
NOT (2,4).

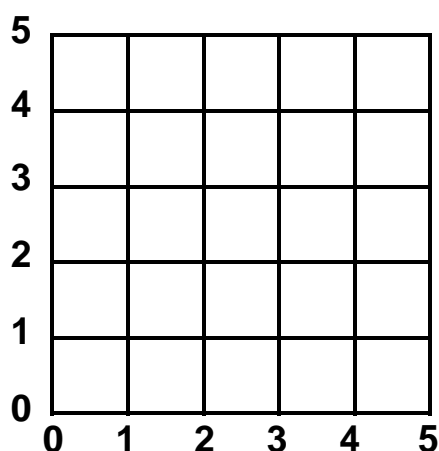
So this is the point (1,3)?

Yes, you've got it, Big Brain!



Here is a list of co-ordinates.
Plot these on the grid by
putting **small** crosses.
Because I am a really
generous fellow, I have done
one for you.

(4,5) (5,3) (2,2) (1,4) (1,5)
(1,0) (4,0) (4,4) (0,2) (0,0)



Well, that was pretty boring!
Would you like to draw a Maths
Rat's house now?

**Plot the points and join them
up as you go.**

First the **house**:

(0,0) (5,0) (5,3) (4,4) (1,4) (0,3) (0,0)

Then the **door**:

(2,0) (2,1) (3,1) (3,0)

Then the **two windows**:

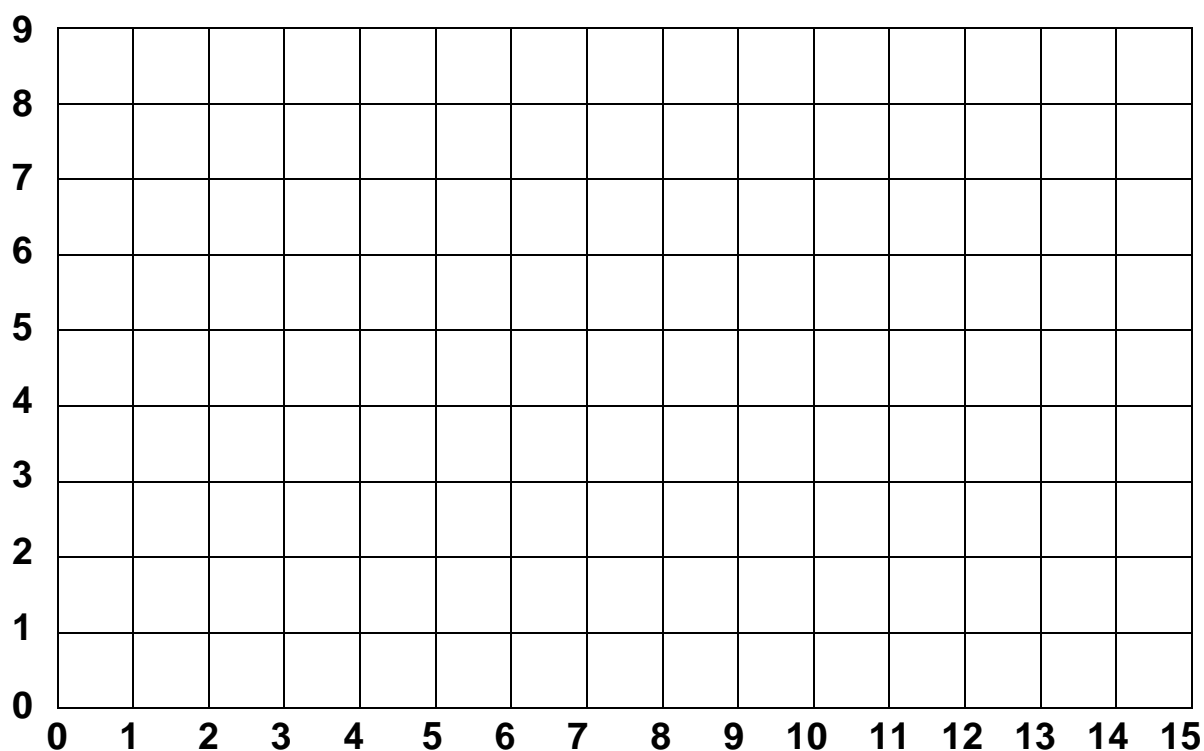
(1,2) (2,2) (2,3) (1,3) (1,2) and (3,2) (4,2) (4,3) (3,3) (3,2)



That's a great house, yes?

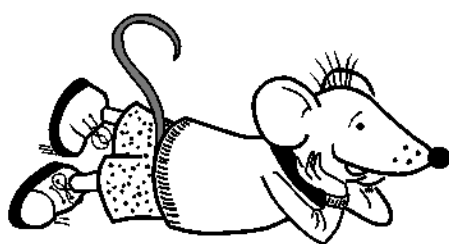
Plot these points and see what they make:

A star means start a new part of the drawing - do not join it to the other parts.



(1,1) (3,1) (3,2) (5,2) (5,1) (11,1) (11,2) (13,2) (13,1) (14,1) (15,2) (15,7)
 (14,8) (3,8) (2,7) (2,5) (1,5) (0,4) (0,2) (1,1) *
 (3,4) (5,4) (5,7) (3,7) (3,4) *
 (6,5) (8,5) (8,7) (6,7) (6,5) *
 (9,5) (11,5) (11,7) (9,7) (9,5) *
 (12,5) (14,5) (14,7) (12,7) (12,5)

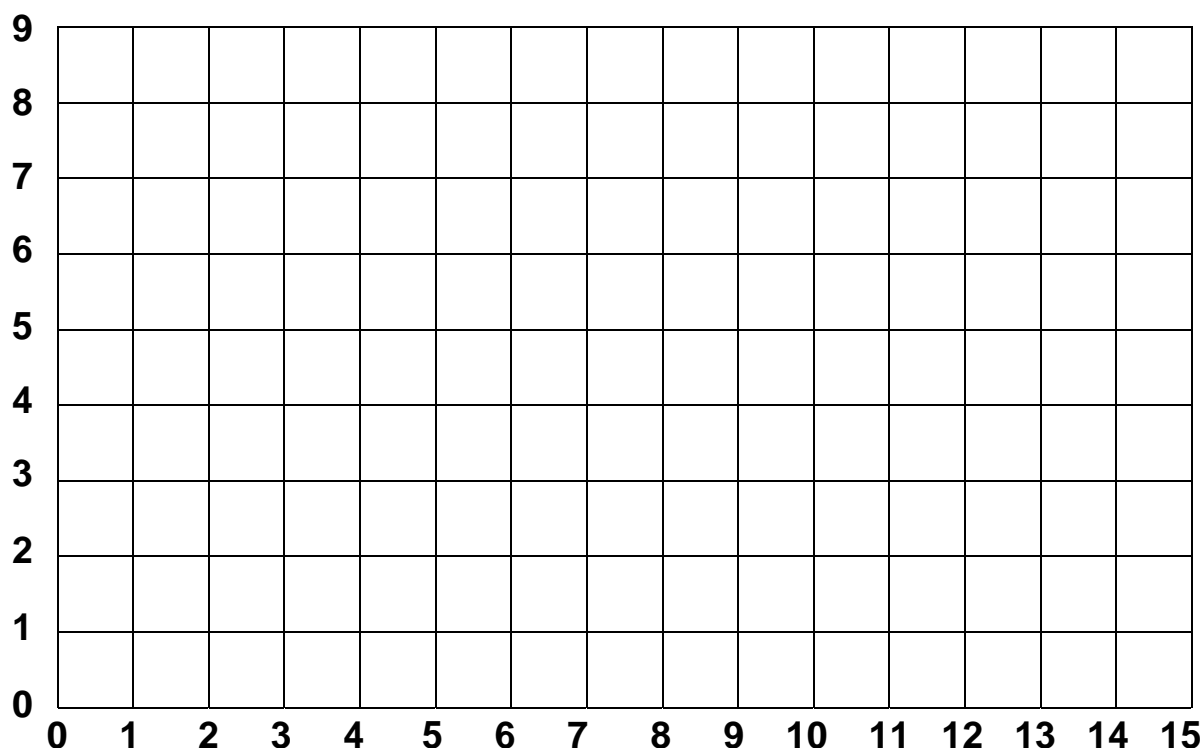
Now draw two circles radius 1cm with their centres at (4,1) and (12,1).



Absolutely terrific!
 So lifelike!

Plot these points and see what they make:

A star means start a new part of the drawing - do not join it to the other parts.



(3,3) (6,3) (6,4) (8,4) (8,3) (12,3) (12,5) (13,6) (15,6) (15,4) (14,3) (14,1)
 (13,0) (3,0) (3,1) (1,3) (1,4) (0,4) (0,5) (2,5) (2,4) (3,3) *
 (7,4) (7,5) (4,4) (4,7) (10,9) (10,6) (7,5) *
 (7,8) (7,9)

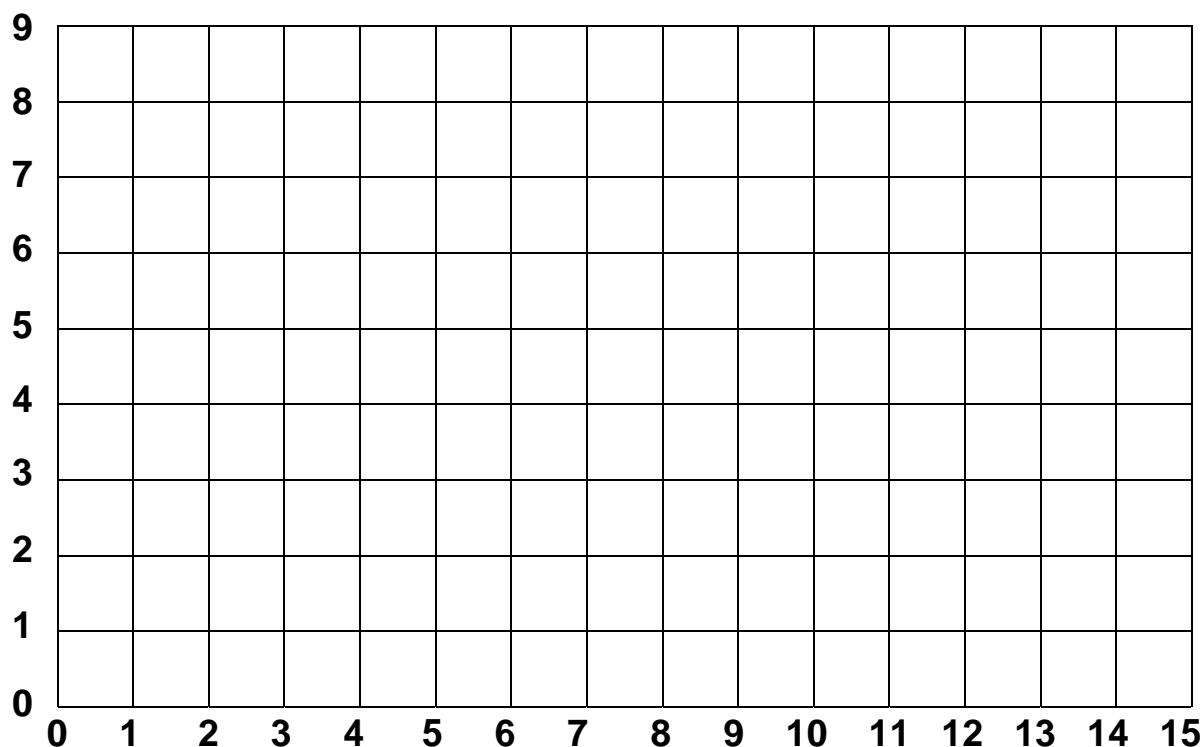
Now decorate your drawing.



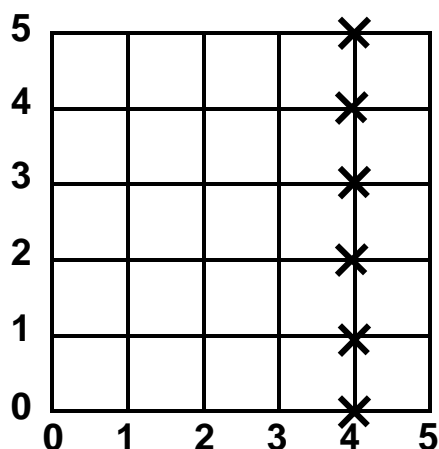
Ahoy there, me hearties!

Draw your own shape on the grid below. Do not make it too difficult!

Use a star to mean 'start a new part of the drawing'.



Write the co-ordinates of your shape below. You could give these co-ordinates to a friend to see if they can draw your shape.



Do you know the difference between a **column** and a **row**?

Here is a **column** of points. Write down their co-ordinates.

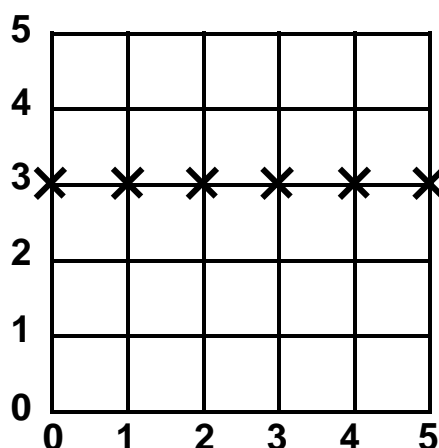
(,) (,) (,) (,) (,)

What do you notice about the co-ordinates of these points?

Plot another **column** of points that all begin (2,).

Write down their co-ordinates.

(,) (,) (,) (,) (,)



I'm a bit like a **column**.

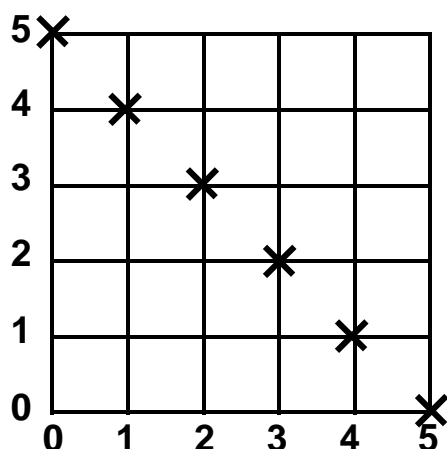
And I'm a bit like a **row**.



Here is a **row** of points. Write down their co-ordinates.

(,) (,) (,) (,) (,)

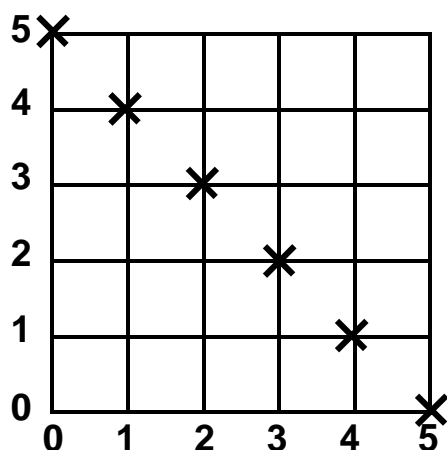
What do you notice about the co-ordinates of these points?



Here is a **diagonal** of points. Write down their co-ordinates.

(,) (,) (,) (,) (,) (,)

Add up the numbers in each bracket. What do you notice?
Draw a line through the points.

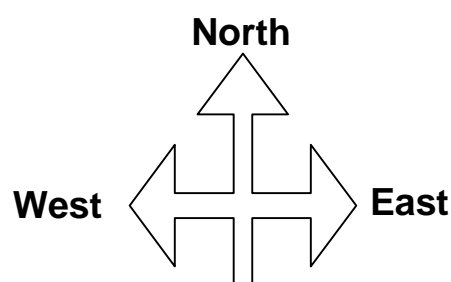
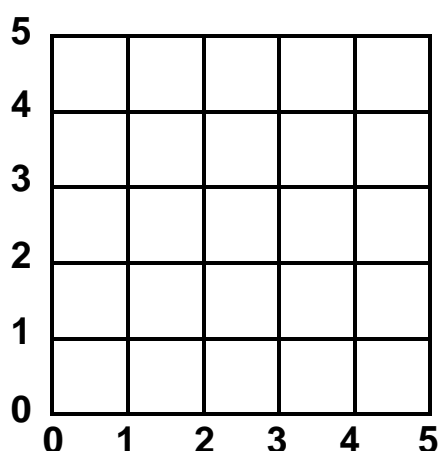


Put the other number in each bracket so that the two numbers add up to 4.

(0,) (1,) (2,) (3,) (4,)

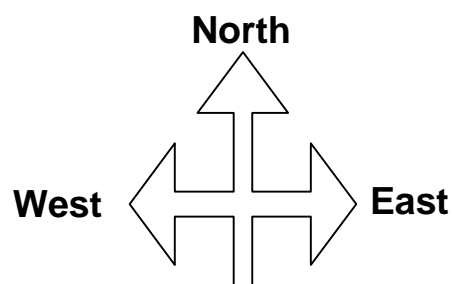
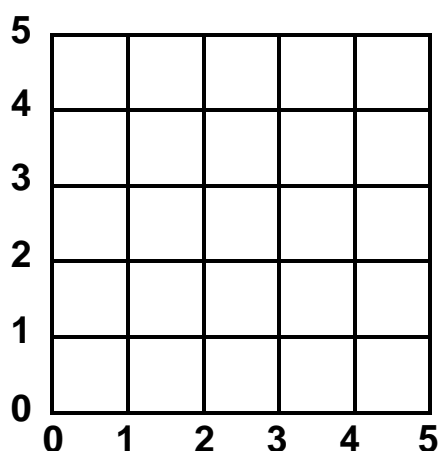
Plot these points on the grid and draw a diagonal line through them.

Can you write another set of points that will give a diagonal line and draw the line?



Imagine that the grid is like a map with North at the top and answer the questions.

- a) If I start at (3,1) and go two squares north, where will I end up?
Give the co-ordinates of the point.
- b) If I start at (1,2) and go three squares east, where will I end up?
Give the co-ordinates of the point.
- c) If I start at (4,5) and go five squares south, where will I end up?
Give the co-ordinates of the point.
- d) If I start at (5,4) and go four squares west, where will I end up?
Give the co-ordinates of the point.
- e) If I start at (1,1) and go three squares north-east, where will I end up?
Give the co-ordinates of the point.
- f) If I start at (1,5) and go two squares south-east, where will I end up?
Give the co-ordinates of the point.
- g) If I start at (0,0) and go five squares north-east, where will I end up?
Give the co-ordinates of the point.
- h) If I start at (2,1) and move to (4,3), which direction did I travel in?
- i) If I start at (5,0) and move to (2,3), which direction did I travel in?



- a) List all the points I travel through if I start at (0,5) and move south-east.
- b) List all the points I travel through if I start at (2,1) and travel north-east.

- c) Draw in my route if I start at (4,2), move two squares north, move three squares west, move one square south-west, move two squares south-east, move one square south, move one square east and move two squares north.

All this talk of routes and travelling is making me hungry!



What are the co-ordinates of my finishing place?

- d) Plot your own route and draw it on a grid. Write down the co-ordinates of your starting point and describe each stage of your journey. Say where you finish.
- e) Write down the co-ordinates of all the places you could finish a journey of five squares if you start at the origin (0,0). You may only travel north or east.

For example, you could choose the route **a, d, i, l**.

Find two places at a time and see what direction one place is from the other. For example, Brighton is south of London.

Put your findings in this table.

[illegible]

Answers

<p>Page 4</p> <p>The house has a front door and two windows upstairs.</p>	<p>Page 9</p> <p>(0,5) (1,4) (2,3) (3,2) (4,1) (5,0) Each pairs adds up to 5. (0,4) (1,3) (2,2) (3,1) (4,0)</p>
<p>Page 5</p> <p>The co-ordinates produce the outline of a simple coach.</p>	<p>Page 10</p> <p>a) (3,3) b) (4,2) c) (4,0) d) (1,4) e) (4,4) f) (3,3) g) (5,5) h) north-east i) north-west</p>
<p>Page 6</p> <p>The co-ordinates produce the outline of a sailing ship.</p>	<p>Page 11</p> <p>a) (0,5) (1,4) (2,3) (3,2) (4,1) (5,0) b) (2,1) (3,2) (4,3) (5,4) c) Finish at (3,2) e) (0,5) (1,4) (2,3) (3,2) (4,1) (5,0)</p>
<p>Page 8</p> <p>(4,0) (4,1) (4,2) (4,3) (4,4) (4,5) They all begin with 4. (2,0) (2,1) (2,2) (2,3) (2,4) (2,5) (0,3) (1,3) (2,3) (3,3) (4,3) (5,3) They all end with 3.</p>	<p>Page 11</p> <p>1) a,b,e,j a,d,g,j a,d,i,l c,h,k,l c,f,i,l c,f,g,j</p>