

# Graphs

Spring Term

Graphs

## Topics

- Coordinates
- Straight line graphs
- Gradients
- Intercepts

## What do I need to be able to do?

- Name and plot coordinates
- Recognise and sketch horizontal and vertical graphs
- Complete tables of values
- Plot straight line graphs
- Identify gradients/intercepts

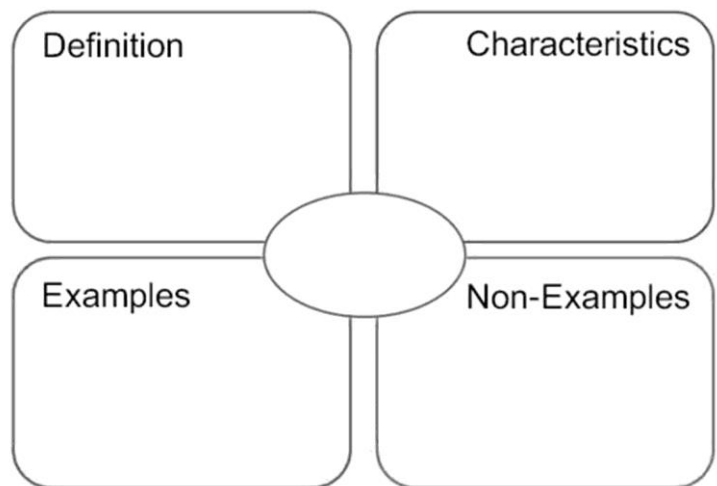
## Key Vocabulary

|             |  |
|-------------|--|
| Axis        | A fixed reference line a grid to help show the position of coordinates |
| Gradient    | How steep a graph is at any point                                      |
| Y intercept | Where the graph cuts through the y axis                                |
| Coordinate  | A set of values that show an exact position                            |
| Quadrant    | Any of the 4 areas made when we divide up a plane by an x and y axis   |
| Vertical    | In an up and down position. The y axis is the vertical axis            |
| Horizontal  | Going side to side. The x axis is the horizontal axis                  |
| Graph       | A diagram showing the relationship between two quantities              |

## Career Links

Being able to confidently work with graphs is a great skill to have and has lots of links with a number of careers such as:

- Analysts
- Economists
- Operations researchers
- Finance
- Marketing



### Calculating the gradient from two points

Calculate the gradient of a line that passes through the points (4,10) and (-3,-11).

Use the formula  $\frac{y_2 - y_1}{x_2 - x_1}$  or  $\frac{\text{Change in } y}{\text{Change in } x}$

- 1) Label your coordinates.  
(4,10) and (-3,-11).

$$x_1, y_1 \quad x_2, y_2$$

- 2) Substitute into the formula or your choice.

$$\frac{-11 - 10}{-3 - 4}$$

- 3) Simplify the fraction.

$$\frac{-21}{-7} = 3$$

So the gradient of the line joining these two points is 3.

### Finding the equation of a line from two points

Find the equation of the line passing through the points (3,1) and (-2,-9).

- 1) Find the gradient, using the formula.  $\frac{y_2 - y_1}{x_2 - x_1} = \frac{-9 - 1}{-2 - 3} = \frac{-10}{-5} = 2$

- 2) Write out the equation replacing  $m$  with the found gradient.  $y = 2x + c$

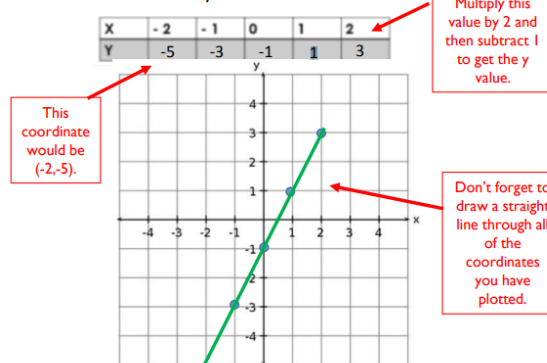
- 3) Substitute in one pair of coordinates and rearrange to calculate the value of  $c$ .  $1 = (2 \times 3) + c$   
 $1 = 6 + c$   
 $-5 = c$

- 3) Re-write your equation in the form  $y = mx + c$  with your calculated values of  $m$  and  $c$ .  $y = 2x - 5$

Linear graphs are straight line graphs. We substitute the  $x$  value into the equation to get the  $y$  value. Once we have both we can then plot the coordinates and draw the graph.

Draw the graph of  $y = 2x - 1$ .

To do this we multiply the  $x$  value by 2 and then subtract 1 to get the  $y$  value.  
 $y = 2x - 1$



Notice this graph has a gradient of 2 (the  $y$  values go up by 2 each time) and a  $y$ -intercept of -1 (the graph cuts through the  $y$  axis at -1).



# Shape

Spring Term

Angles

## Topics

- Measuring and drawing angles
- Angles on a line
- Angles around a point
- Angles in a triangle
- Vertically opposite angles

## What do I need to be able to do?

- Identify acute, obtuse and reflex angles
- Be able to draw an angle using a compass
- Know that angles on a line add up to  $180^\circ$
- Know that angles around a point add up to  $360^\circ$
- Know that angles in a triangle add up to  $180^\circ$

## Career Links

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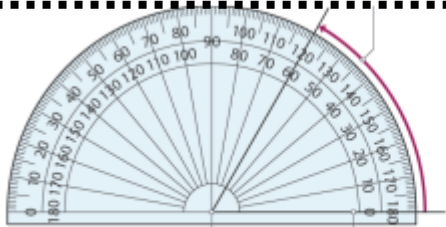
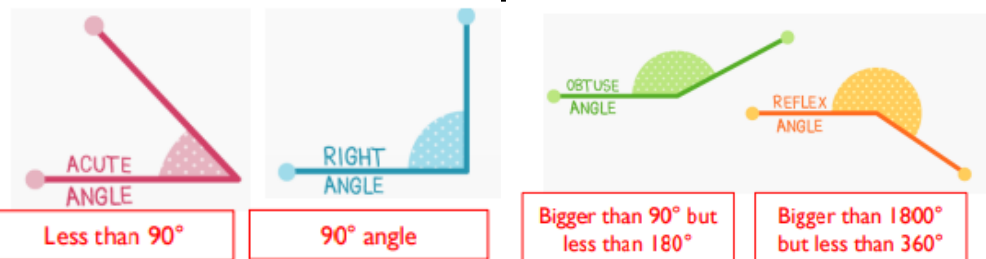
- Analysts
- Economists
- Operations researchers

## Key Vocabulary

|                     |   |
|---------------------|---|
| Angle               | The amount of turn between two lines and their common point   |
| Vertically opposite | Angles formed when two or more straight line cross at a point |
| Point               | An exact location   |
| Protractor          | An instrument for measuring angles                            |
| Compass             | An instrument for drawing circles and arcs                    |
| Triangle            | A 3 sided shape where the angles inside add up to $180^\circ$ |
| Acute               | An angle smaller than $90^\circ$                              |
| Obtuse              | An angle bigger than $90^\circ$                               |
| Reflex              | An angle bigger than $180^\circ$                              |

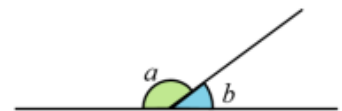
## Angle Notation

Angles are measured in degrees ( $^\circ$ ).  
An angle can be identified like this  $\angle ABC$   
The middle letter is the vertex.

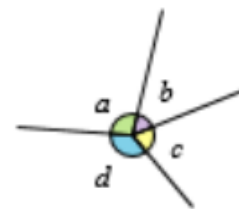
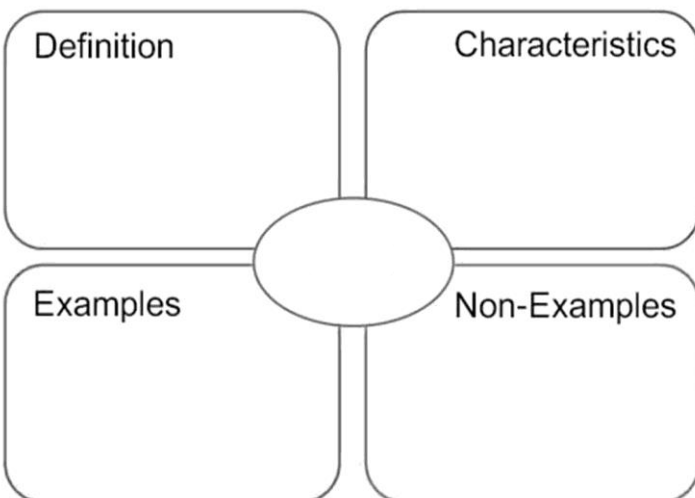


Always read from zero.  
In this example use the inside scale

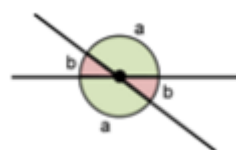
Ensure the centre and base line are lined up with the angle lines



$a + b = 180^\circ$   
because there are  $180^\circ$  in a half turn.



$a + b + c + d = 360^\circ$   
because there are  $360^\circ$  in a full turn.



Vertically opposite angles are equal