



YEAR 8

KNOWLEDGE ORGANISERS



BLOCK: REPRESENTATIONS

Working in the Cartesian plane
Representing data

"MATHS OPENS DOORS"

YEAR 8 - REPRESENTATIONS...

Working in the Cartesian plane

What do I need to be able to do?

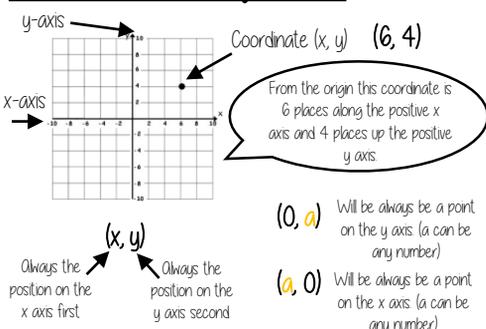
By the end of this unit you should be able to:

- Label and identify lines parallel to the axes
- Recognise and use basic straight lines
- Identify positive and negative gradients
- Link linear graphs to sequences
- Plot $y = mx + c$ graphs

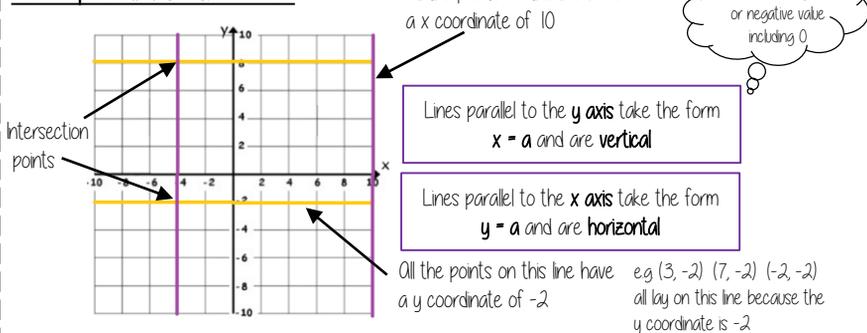
Keywords

- Coordinates:** a set of values which show an exact position
- Gradient:** a measure of how steep a line or curve is, also called the slope
- Horizontal:** going side to side, like the horizon, parallel to the x-axis. Opposite to vertical
- Intercept:** the point where a graph crosses one of the axes
- Origin:** the point where the x- and y-axes cross, with coordinates (0,0)
- Parallel:** straight lines which are always the same distance apart and never touching
- Quadrant:** any of the four areas made when we divide up the plane by an x- and y-axis
- Vertical:** in an up-down direction or position, parallel to the y-axis. Opposite to horizontal

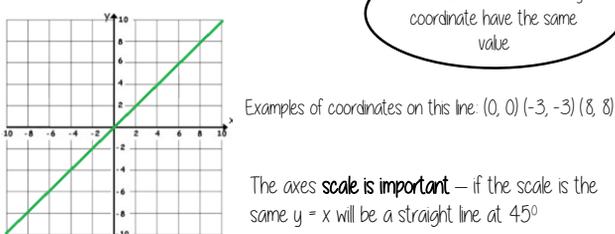
Coordinates in four quadrants



Lines parallel to the axes

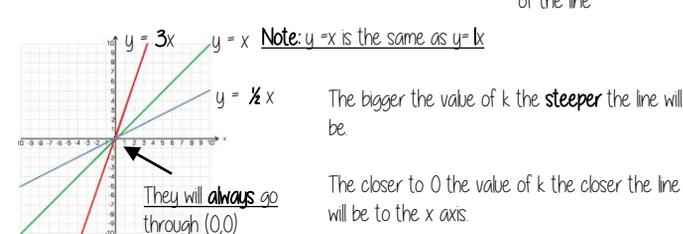


Recognise and use the line $y=x$

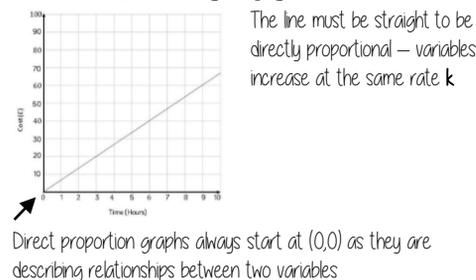


Recognise and use the lines $y=kx$

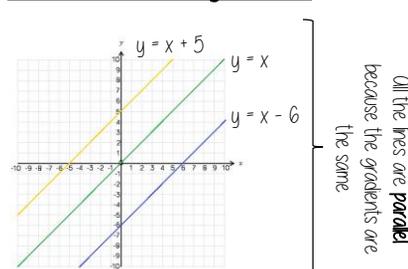
The value of k changes the steepness of the line



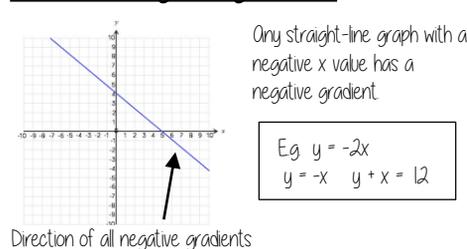
Direct Proportion using $y=kx$



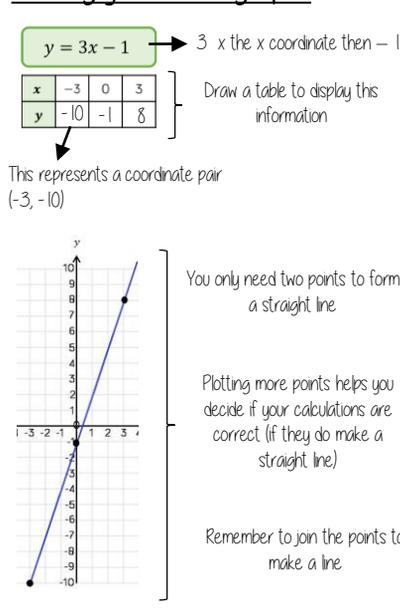
Lines in the form $y = x + a$



Lines with negative gradients



Plotting $y = mx + c$ graphs



YEAR 8 - REPRESENTATIONS...

Representing Data

What do I need to be able to do?

By the end of this unit you should be able to:

- Draw and interpret scatter graphs
- Describe correlation and relationships
- Identify different types of non-linear relationships
- Design and complete an ungrouped frequency table
- Read and interpret grouped tables (discrete and continuous data)
- Represent data in two way tables

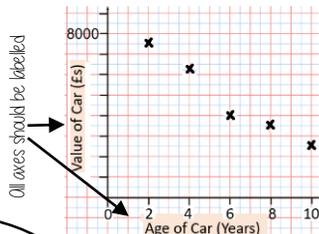
Keywords

Continuous data: quantitative (numerical) data which can take any value within its range, e.g. height, length, weight
Correlation: the link between two sets of data
Discrete data: quantitative (numerical) data which can only take certain values, usually whole numbers
Frequency: the number of times a particular item appears in a set of data
Line of best fit: a line drawn on a graph showing the general direction that a set of points seem to follow
Origin: the point where the x- and y-axes cross, with coordinates (0,0)
Outlier: a value that "lies outside" (is much smaller or larger than) most of the other values in a set of data
Qualitative data: information that describes something in a non-numerical way, e.g. colour, gender, names
Relationship: a link or connection between objects
Variable: a letter or symbol representing a quantity that can change in value. The most commonly used letters are x, y and n.

Draw and interpret a scatter graph

Age of Car (Years)	2	4	6	8	10
Value of Car (£s)	7500	6250	4000	3500	2500

- This data may not be given in size order
- The data forms information pairs for the scatter graph
- Not all data has a relationship



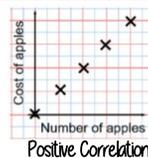
All axes should be labelled

The axis should fit all the values on and be equally spread out

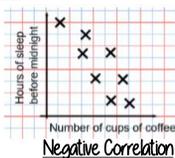
"This scatter graph shows as the age of a car increases the value decreases"

The link between the data can be explained verbally

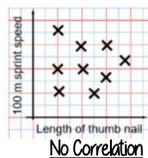
Linear Correlation



As one variable increases so does the other variable



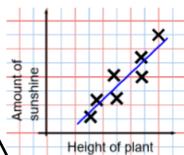
As one variable increases the other variable decreases



There is no relationship between the two variables

The line of best fit

The Line of best fit is used to make estimates about the information in your scatter graph



It is only an estimate because the line is designed to be an average representation of the data

It is always a straight line.

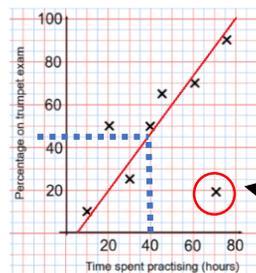
Things to know:

- The line of best fit **DOES NOT** need to go through the origin (The point the axes cross)
- There should be approximately the same number of points above and below the line (It may not go through any points)
- The line extends across the whole graph

Using a line of best fit

Interpolation is using the line of best fit to estimate values inside our data point

e.g. 40 hours revising predicts a percentage of 45



Extrapolation is where we use our line of best fit to predict information outside of our data

This is not always useful - in this example you cannot score more than 100%. So revising for longer can not be estimated

This point is an "outlier" it is an outlier because it doesn't fit this model and stands apart from the data

Ungrouped Data

The number of times an event happened

Number of siblings	Frequency
0	2
1	3
2	4
3	2
4	1

Best represented by discrete data (Not always a number)

The table shows the number of siblings students have. The answers were

3, 1, 2, 2, 0, 3, 4, 1, 1, 2, 0, 2

2 people had 0 siblings. This means there are 0 siblings to be counted here

0

3

$2 + 2 + 2 + 2$ OR $2 \times 4 = 8$

$3 + 3$ OR $3 \times 2 = 6$

4

2 people have 3 siblings so there are 6 siblings in total

OVERALL there are
 $0 + 3 + 8 + 6 + 4$
Siblings = 21 siblings

Grouped Data

If we have a large spread of data it is better to group it. This is so it is easier to look for a trend. Form groups of equal size to make comparison more valid and spread the groups out from the smallest to the largest value.

Cost of TV (£)	Tally	Frequency
101 - 150	THH	7
151 - 200	THH THH	11
201 - 250	THH	5
251 - 300		3

Discrete Data
The groups do not overlap

We do not know the exact value of each item in a group - so an estimate would be used to calculate the overall total (Midpoint)

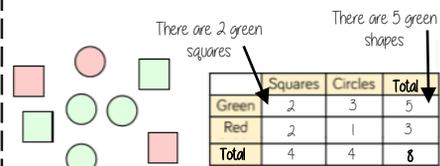
Continuous Data
To make sure all values are included inequalities represent the subgroups

x	Frequency
Weight (g)	
$40 < x \leq 50$	1
$50 < x \leq 60$	3
$60 < x \leq 70$	5

e.g. this group includes every weight bigger than 60kg, up to and including 70kg

Representing data in two-way tables

Two-way tables represent discrete information in a visual way that allows you to make conclusions, find probability or find totals of sub groups



Using your two-way table

To find a fraction
 e.g. What fraction of the items are red? $\frac{3}{8}$ red items
 but 8 items in total = $\frac{3}{8}$

Interleaving: Use your fraction, decimal percentage, equivalence knowledge