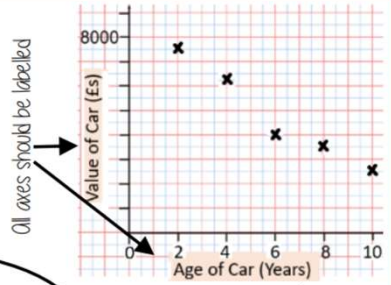
Unit 16: Scatter graphs- Red indicates higher tier only -

Knowledge Organiser - Mathematics

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

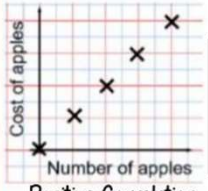


"This scatter graph show as the age of a car increases the value decreases"

The link between the data can be explained verbally

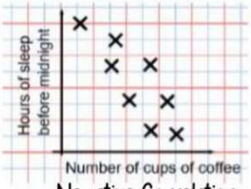
The axis should fit all the values on and be equally spread out

Linear Correlation



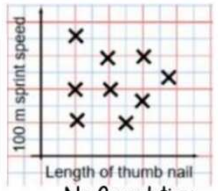
Positive Correlation

As one variable increases so does the other variable



Negative Correlation

As one variable increases the other variable decreases



No Correlation

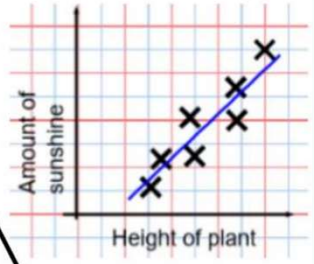
There is no relationship between the two variables

The line of best fit

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

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



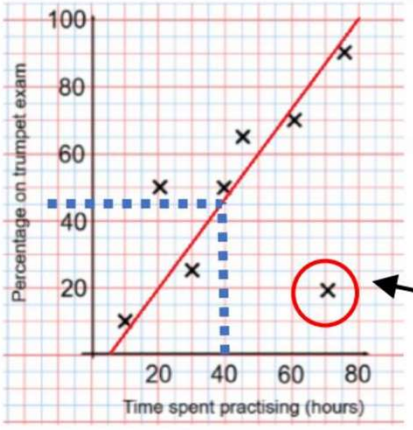
It is only an estimate because the line is designed to be an average representation of the data

It is always a straight line.

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 that 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

Unit 17&18 : Transformations, Similarity, & Congruence - Red indicates higher tier

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Key Words

- *Congruent* – the same size and shape
- *Enlargement* – to change the size of a shape by a given scale factor
- *Invariance* – a property of a shape that remains unchanged following a transformation
- *Parallel* – straight lines that never meet (equal gradients)
- *Rotation* – to change the orientation of a shape
- *Reflection* – to create a flipped image of a shape along a line
- *Scale Factor* – the multiplier of an enlargement
- *Similarity* – two otherwise identical shapes differently sized
- *Transformations* – ways of changing shapes (i.e., enlargements, rotations, reflections, and translations)
- *Translation* – to change the position of a shape on a grid
- *Vector* – a coordinate-based expression for the distance moved during a translation

Transforming Graphs

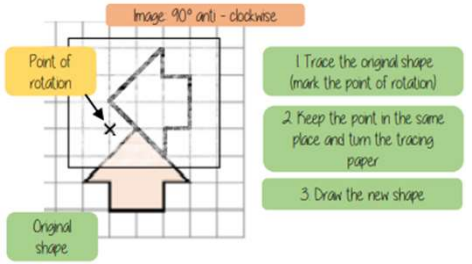
y = -f(x) is a reflection of y = f(x) in the x-axis (y-axis as mirror line).

y = f(-x) is a reflection of y = f(x) in the y-axis (x-axis as mirror line).

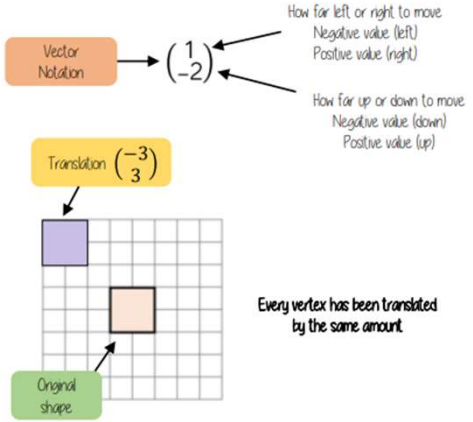
y = f(x) + b translates y = f(x) b squares upwards.

y = f(x + b) translates y = f(x) b squares to the left [counter-intuitive].

Rotation

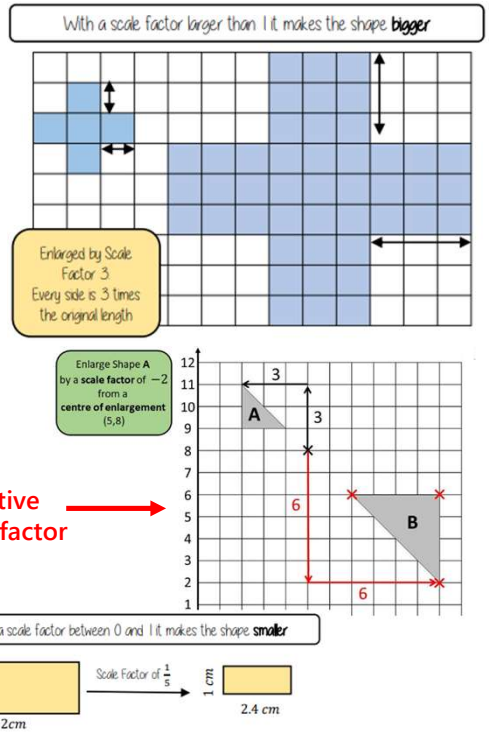


Translations



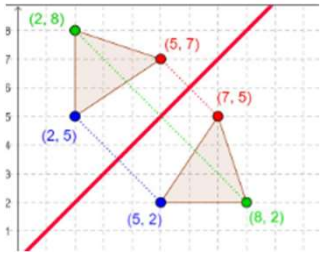
Ratio & Scale

Enlargement



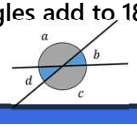
Reflection

Reflected along y = x



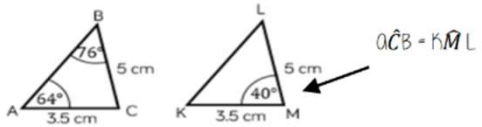
Angle Facts

Angles along a straight line add to 180°
Angles along a point add to 360°
Angles in a triangle add to 180°
Angles in quadrilaterals add to 360°
Vertically opposite angles add to 180°
a = c & b = d

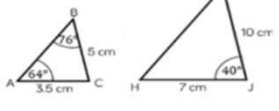


Congruence & Similarity

Congruent shapes are identical – all corresponding sides and angles are the same size



Because all the angles are the same and AC=KM BC=LM triangles ABC and KLM are **congruent**



Because all angles are the same, but all sides are enlarged by 2 ABC and HIJ are **similar**

Congruence in Triangles

Triangles are congruent if they satisfy any of the following conditions

Side-side-side

All three sides on the triangle are the same size

Angle-side-angle

Two angles and the side connecting them are equal in two triangles

Side-angle-side

Two sides and the angle in-between them are equal in two triangles (it will also mean the third side is the same size on both shapes)

Right angle-hypotenuse-side

The triangles both have a right angle, the hypotenuse and one side are the same