

# Need to Know Maths Term 2 Year 10 Set 3 and 4

The Numbers in **Red** are topics that have already been covered in either KS3 or KS4 and are being revisited to help the students to move onto more complicated topics.

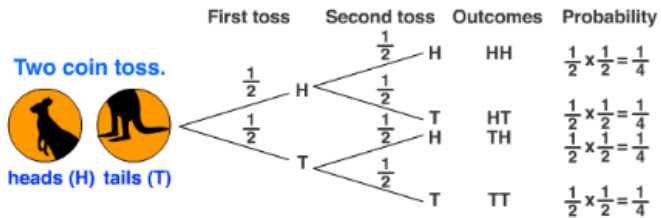
The numbers in **blue** are the GCSE grade of the work being covered

In **Green** are the Maths genie reference which can be used for further revision and questions to try [www.mathsgenie.co.uk](http://www.mathsgenie.co.uk)

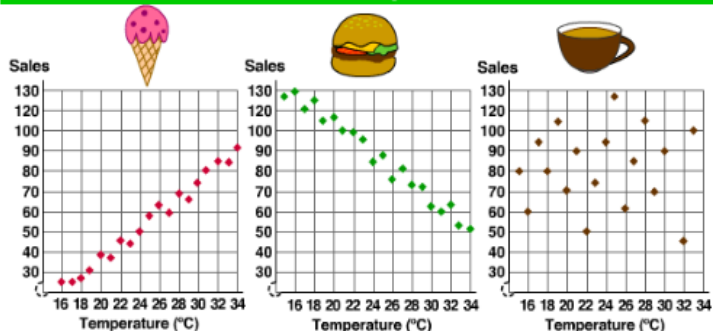
<p><b>Part 1          6 Hours</b></p> <ul style="list-style-type: none"><li>* Probability Tree Diagrams <b>MG5</b></li><li>* <b>Scatter Graphs (Line of Best Fit)</b> <b>MG4</b></li><li>* Angles in Polygons      <b>MG4</b></li><li>* <b>Standard Form</b>                      <b>MG5</b></li></ul>	<p><b>Part 1 - Key Words</b></p> <p>Probability Tree - a diagram shaped like a tree used to display sample space by using one branch for each possible outcome in a probability exercise</p> <p>All probability outcomes must add up to 1</p> <p>Polygon - a plane shape having three or more straight sides. Polygons may be regular with all sides and angles equal, or irregular with varying side and angle size</p> <p>Standard Form is another name for scientific notation, i.e. <math>876 = 8.76 \times 10^2</math>.</p>
<p><b>Part 2          6 Hours</b></p> <ul style="list-style-type: none"><li>* <b>Area of a Circle &amp; Semi Circle</b>                      <b>MG3</b></li><li>* <b>Circumference of a Circle</b>                      <b>MG3</b></li><li>* <b>Pythagoras</b> <b>MG4</b></li></ul>	<p><b>Part 2 – Key Words</b></p> <p>Area of Circle – <math>\pi \times r^2</math></p> <p>Circumference (Perimeter) of Circle - <math>\pi \times d</math>                      <math>\pi \approx 3.14</math> ,      <math>r = \text{radius}</math> ,      <math>d = \text{diameter}</math></p> <p>Pythagoras - <math>a^2 + b^2 = c^2</math></p>
<p><b>Part 3          5 Hours</b></p> <ul style="list-style-type: none"><li>* <b>Translation</b> <b>MG3</b></li><li>* <b>Rotation</b> <b>MG3</b></li><li>* <b>Reflection</b> <b>MG3</b></li><li>* <b>Enlargement</b> <b>MG3</b></li><li>* <b>Describing Transformations</b> <b>MG3</b></li></ul>	<p><b>Part 3 – Key Words</b></p> <p>Translation - move an item in any direction without rotating it</p> <p>Rotation - to turn an object around a centre point; the angle of rotation is measured in degrees</p> <p>Reflection (Symmetry) - a geometric transformation resulting in a mirror image. A shape is flipped over a mirror line or line of reflection to face the opposite direction</p> <p>Enlargement - a transformation where a shape is made larger (or smaller if reversed) without changing its position or direction</p>
<p><b>Part 4          9 Hours</b></p> <ul style="list-style-type: none"><li>* <b>Basic Percentages With &amp; Without a Calculator</b> <b>MG3</b></li><li>* Reverse Percentages <b>MG5</b></li><li>* Compound Interest <b>MG4</b></li><li>* <b>Fractions – Adding, Subtracting, Multiplying &amp; Dividing</b> <b>MG3</b></li><li>* <b>Collecting Like Terms</b> <b>MG1/2</b></li></ul>	<p><b>Part 4 - Key Words</b></p> <p>Simple Interest - interest is an amount of money a lender charges a borrower for a loan and also the amount of money paid as a return on an investment</p> <p>Compound Interest - interest that is calculated on both the principal and any accrued interest added to the sum. Sometimes described as 'interest on interest'.</p>

## tree diagram

Probabilities can be multiplied along the branches.



## scatter plot

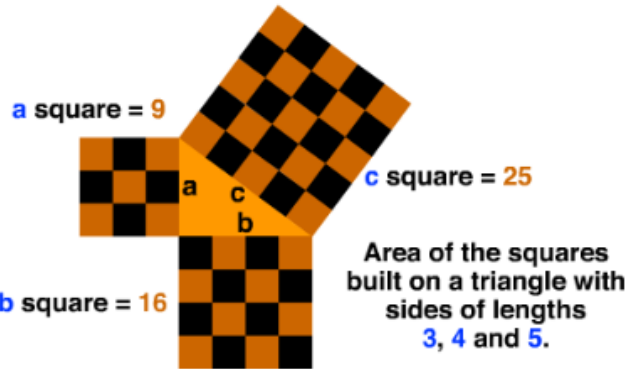


A line of best fit or trend line is a straight line that best represents the values on a scatter plot.

## Pythagoras' theorem

$$a^2 + b^2 = c^2$$

$$9 + 16 = 25$$



## percentages and amounts

To calculate a percentage of an amount, write the percent as a fraction and multiply by the amount.

$$\frac{\text{percent}}{100} \times \text{amount} =$$

Example: 11% of 40 =  $\frac{11}{100} \times 40 = \frac{440}{100} = 4.4$

To calculate an amount as a percentage of a total, write the amount over the total as a fraction and multiply by 100.

$$\frac{\text{amount}}{\text{total}} \times 100 = \%$$

Example:  $\frac{4}{20} \times 100 = \frac{400}{20} = 20\%$

## regular polygons ... fact chart

Regular polygons	No. of sides and vertices	No. of angles	Size of interior angles	No. of lines of symmetry	Order of rotational symmetry
equilateral triangle	3	3	60°	3	3
square	4	4	90°	4	4
pentagon	5	5	108°	5	5
hexagon	6	6	120°	6	6
heptagon	7	7	128.6°	7	7
octagon	8	8	135°	8	8
nonagon	9	9	140°	9	9

Compound interest will make a loan or deposit grow at a faster rate than simple interest, which is calculated using the principal only.

## formulas

$$FV = PV \times (1+r)^n$$

FV = Future Value  
PV = Present Value  
r = annual interest rate  
n = number of years or periods

Calculates the future value at the end of a given period of time.  
Example: A five year deposit of \$10,000.00 earning 10% per year.

$$FV = 10,000 \times (1 + 0.1)^5$$

$$FV = 10,000 \times (1.1)^5$$

$$FV = 10,000 \times 1.61$$

$$FV = 16,105.10$$

## The following are like terms because ...

$$2y^2 \quad 10y^2 \quad 2y^2$$

all terms have the same variable and exponent  $y^2$ , only the coefficient is different.

$$2y \quad 10y \quad y \quad -y$$

all terms have a single variable, y.

$$20 \quad -5 \quad 6 \quad 0.6$$

all terms are constants.

## adding like terms

$$y^2 + x + 10y^2 + 2x - 2 + 5 + (-2y^2)$$

$$= 9y^2 + 3x + 3$$