

Maths – Year 10 Foundation

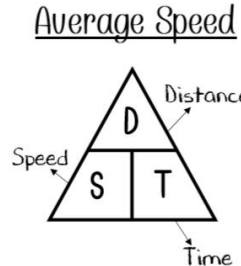
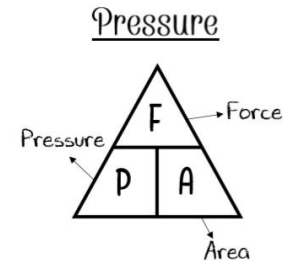
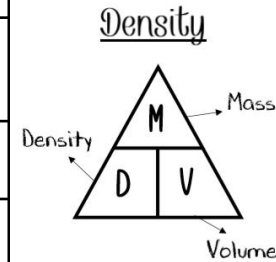
Maths Half Terms 1-6



Rearrange Formulae	Formula	A special type of equation that shows the relationship between variables	$A = bh$ is the formula for the area of a rectangle
	Formulae	Plural of formula	(area = base x height)
	Subject	The variable that is being worked out. It is the letter on its own on one side of the equals sign	A is the subject of the formula .
	Inverse Operation	The opposite operation	Multiply is the inverse operation to divide
	Expression	Contains numbers, operations and one or more variables	$4x + 3y$
	Factorise	Rewrite an expression into brackets	$6x + 3 = 3(2x + 1)$
	Rearrange	Move terms around using inverse operations	$t + u = v \rightarrow t = v - u$
	Change the subject of a formula	Isolate a term using inverse operations, rearranging the formula	Make y the subject of the formula: $t = 3y + 4x$
Linear Graphs	Axes	The horizontal and vertical lines on a graph (singular axis)	The x axis is horizontal , the y axis is vertical .
	Coordinates	A pair of numbers which show a point on a graph	The x coordinate tells us how far along you go, the y coordinate tells us how far up or down you go
	Equation	The rule for finding coordinates for your graph	$y = 3x - 4$
	Plot linear graphs	Plot all points and join with a straight line	Remember to label x and y axes
	Midpoint of a line	The middle of a line segment	Formula: Add x coordinates $\div 2$, Add y coordinates $\div 2$

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$y = mx + c$	Gradient	How steep the line is	m in $y=mx+c$
	Y intercept	Where the graph crosses the y axis	c in $y = mx + c$
	Parallel	Parallel lines have the same gradient	m in $y=mx+c$
Compound Measures	Standard Units	One unit	time, mass, length, money, volume, area
	Compound Units	Made of two or more units	speed, rates of pay, prices
	Speed	Speed = distance \div time	30 miles per hour
	Density	Density = mass \div volume	6 g/litre
	Pressure	Pressure = force \div area	N/m^2

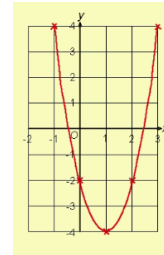


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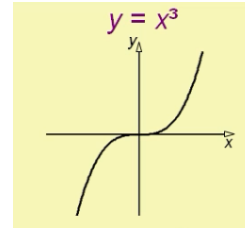
Quadratic Graphs, Turning Points and Roots	Squared	To the power 2	4 squared means $4^2 = 4 \times 4$
	Quadratic Graphs	Equations in the form $y = ax^2 + bx + c$	The graphs are a U shape
	Roots	Where the graph crosses the x axis	
	Turning Points	The coordinate of where the graph turns	It is the bottom or the top of the graph
	Factorising	Rewrite the equation in brackets .	When we solve it tells us the roots of the equation

Linear Simultaneous Equations	Simultaneous	Things that happen at the same time
	Equation	The rule for finding coordinates for your graph
	Solve Simultaneous Equations	<p>Simultaneous equations are two equations with two unknowns. They are called simultaneous because they must both be solved at the same time.</p> <p>Use the elimination method:</p> <ol style="list-style-type: none"> 1) Get rid of the terms that are the same 2) If the operation signs are the same then subtract the remaining terms. If the operation signs are NOT the same you have to add the remaining terms. 3) Solve the equation to find the variable x or y 4) Substitute your known variable back into one of the equations to find the remaining variable.
	Graphically	Solve something on a graph

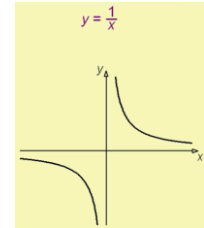
Further Graphs	Cubic	An equation with the highest power of x is x^3
	Reciprocal	An equation where x is in the denominator
	Numerator	The top number in a fraction
	Denominator	The bottom number in a fraction
	Direct proportion	As one quantity increases , so does another at the same rate
	Inverse Proportion	As one quantity increases , the other decreases



Quadratic Graph



Cubic Graph



Reciprocal Graph



Direct Proportion Graph



Inverse Proportion Graph

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Probability	Probability	How likely something is to happen. Always given as a Fraction, Decimal or Percentage
	Probability Scale words	Impossible, Unlikely, Even chance, Likely, Certain
	Probability Scale numbers	Impossible = 0, Even chance = 0.5 or ½ or 50%, Certain = 1 or 100%
	Two Way Table	Used when there are two categories
	Frequency Trees	Used when there are two or more categories
	Sample Space	Listing all of the possible outcomes from two events, for example flipping a coin and rolling a dice
	Mutually Exclusive Events	Mutually exclusive events cannot happen at the same time. Events sum to 1.
	Venn Diagrams	Comparing 2 or more sets of data that share some things in common
	Element	A list of numbers, objects or outcomes
	Universal Set	Contains all of the elements for our question
	Set notation	A – all elements in A A' – all elements not in A B – all elements in B B' – all elements not in B
	Intersection	A ∩ B – all the elements in both A and B
	Union	A ∪ B – all the elements in A or B or both
	Tree Diagrams	Used when there are two or more events . Each pair of branches add to 1 (mutually exclusive) To find the probabilities we multiply along the branches

Standard Form	Write number in standard form	A way of writing large or small numbers $a \times 10^b$ $1 \leq a < 10$
	10⁸	Positive power, multiply
	10⁻⁴	Negative power, divide
	Base	The number that will be multiplied by itself (eg 5 ³ the base is 5)
	Power	The small number in 10 ³ , tells you how many times you multiply the base by itself. 10 ³ means 10x10x10
	Index number	Another word for power , plural is indices
	10⁴	Ten to the power four , means 10 x 10 x 10 x 10 because the power is 4
	10³	Ten Cubed , means 10 x 10 x 10 because the power is 3
	10²	Ten squared , means 10 x 10 because the power is 2
	10¹	Ten to the power one , just means 10 because the power is 1
	10⁰	Ten to the power zero. Anything to the power zero always equals 1
	10⁻¹	Ten to the power negative 1 = 0.1
	10⁻²	Ten to the power negative 2 = 0.01
	Multiply indices	Numbers with the same base , add the indices $10^6 \times 10^4 = 10^{6+4}$ $= 10^{10}$
	Divide indices	Numbers with the same base , subtract the indices $10^9 \div 10^7 = 10^{9-7}$ $= 10^2$

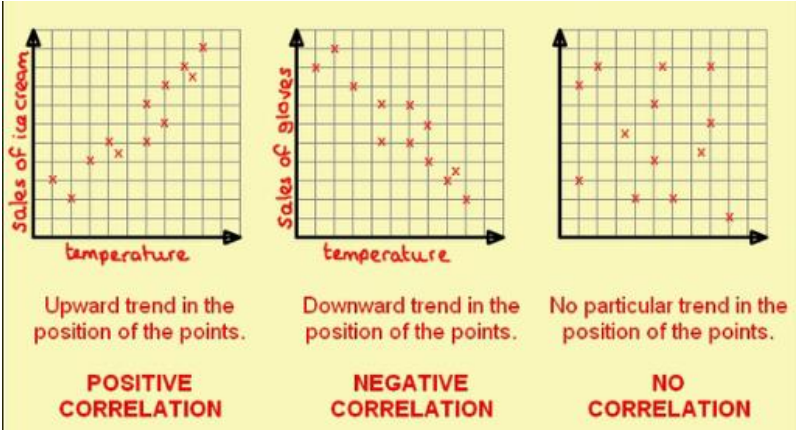
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Simple Interest	Cent	Means 100 in Latin, for example a century is 100 years
	Percentage	Means out of 100
	Percentage of an Amount (Need to know)	$1\% = \div 100$ $10\% = \div 10$ $5\% = \text{halve } 10\%$ $20\% = \text{double } 10\%$ $50\% = \div 2$ $25\% = \text{halve } 50\%$ $75\% = 50\% + 25\%$
	Percentage of an Amount	(Amount \div 100) x Percentage Example, find 30% of £210 $(210 \div 100) \times 30 = 2.1 \times 30$ $= \text{£}63.00$
	Convert percentage to decimal	Decimal = percentage \div 100
	VAT	Value Added Tax A tax that is added to goods that you buy
	Income Tax	Tax that you pay from your wages
	Simple Interest	Calculate the percentage amount and multiply it by the number of periods that the money will be invested for.
	Simple interest steps	<ol style="list-style-type: none"> 1. Find the percentage of the amount 2. Multiply by how many months/years it asks for in the question 3. Add this answer to the original amount

Ratio (Further)	Ratio	How much of one thing there is compared to another, usually written as 3 : 4
	Parts	The numbers in the ratio, 3 parts : 4 parts
	Simplify	Make the numbers smaller, divide by the Highest Common Factor
	Writing a Ratio as a Fraction	Each part of the ratio is the numerator , add the parts to make denominator . Example 3 : 4 written as a fraction The parts are 3 and 4 so these are the numerators $3 + 4 = 7$ so the denominator is 7 $3/7$ and $4/7$
	Scale	The ratio between the distance on a map and that in real life
Growth and Decay	Growth	Getting bigger
	Decay	Getting smaller
	Appreciation	The value of something increasing
	Depreciation	The value of something decreasing
	Interest Rate	Money that is paid regularly as a percentage , this is usually by a bank when money is saved or borrowed.
	Compound Interest	Interest that gets added regularly (eg. monthly, annually), changes the value of money each time so a new calculation has to be completed.
	Multiplier Method	Amount x (1 + percentage as a decimal)ⁿ number of years Example £4000 saved for 3 years at 2% interest rate $2\% = 0.02$ as a decimal $1 + 0.02 = 1.02$ $4000 \times 1.02^3 = \text{£}4161.60$

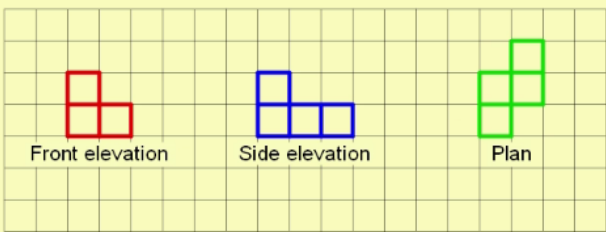
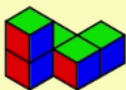
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Statistics

Data	Information that is collected	Scatter Graphs	A graph of plotted points that compares two sets of information
Quantitative Data	Numerical answers	Line of best fit	A line on your scatter graph that best describes the relationship between the two sets of data <ul style="list-style-type: none"> • A straight line • Goes roughly through the middle of the points on your scatter graph • There should be an equal number of points above and below your line
Qualitative Data	Descriptive answers, for example eye colour		
Discrete Data	Whole number answers, like how many people walk to school		
Continuous Data	Measured on a scale , like weight or height		
Primary Data	Data that you have collected	Correlation	The relationship between two variables
Secondary Data	Data that someone else has collected	Positive Correlation	As one variable increases so does the other variable
Bar Chart	Shows discrete data , there are gaps between the bars	Negative Correlation	As one variable increases the other decreases
Pictogram	Shows discrete data , pictures are used to show frequencies , must have a key	No Correlation	No relationship between the two variables
Time Series Graphs	Frequencies plotted over time. Points are joined with straight lines	Trend	A pattern in a set of results
		Outliers	A point that is far from the line of best fit
The Product Rule	Used to find the intersection of 2 or more probabilities , eg. PA and PB = PA x PB	 <p>The figure shows three scatter plots on a grid. The first plot has 'Sales of ice cream' on the y-axis and 'temperature' on the x-axis, showing an upward trend. The second plot has 'Sales of gloves' on the y-axis and 'temperature' on the x-axis, showing a downward trend. The third plot has no labels on the axes, showing points scattered randomly. Below each plot is a caption: 'Upward trend in the position of the points.', 'Downward trend in the position of the points.', and 'No particular trend in the position of the points.' At the bottom, the terms 'POSITIVE CORRELATION', 'NEGATIVE CORRELATION', and 'NO CORRELATION' are written in red.</p>	
Mean	Add up your numbers and divide by how many numbers there are		
Median	Put your numbers in order from smallest to largest, the median is the middle number. If there are two middle numbers then the answer is halfway between them		
Mode	The most common number		
Range	The difference between the smallest and largest numbers		

Maths Year 10 Foundation Summer 2

Plans and Elevations	Plan	The view from directly above a 3D shape . You will see a 2D shape .
	Elevation	The view from the front and side of a 3D shape . You will see a 2D shape .
	Sketch	To roughly draw a shape. Always label the sides and write any measurements on.



Constructions and Loci	Perpendicular	Two lines that meet at 90° (right angle)
	Bisect	To cut something equally in two parts
	Line Segment	Part of a line that connects 2 points, it is the shortest distance between 2 points
	Locus	A path that is formed by a rule, eg. 2cm from a point. Plural is loci .
	Region	The area you shade in, defined in your question
	Construction	An accurate diagram using a compass and ruler .

There are four basic situations

the locus of a point that moves so that it is an equal distance from . . .

