Maths – Year 10 Foundation

Maths Half Terms 1-6

Maths Year 10 Foundation Autumn 1

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, operation**s 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 → 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

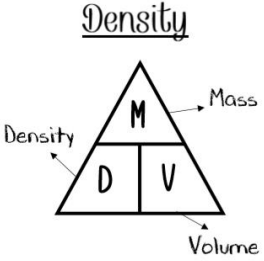
Axes	The **horizontal** and **vertical** lines on a graph (singular **axis)**	The **x axis** is **horizontal**, the **y axis** is **vertical.**
Coordinates	A pair of numbers which show a point on a **graph**	The **x coordinat**e tells us how far along you go, the **y coordinate** tells us how far up 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** ÷ 2, Add **y coordinates** ÷2

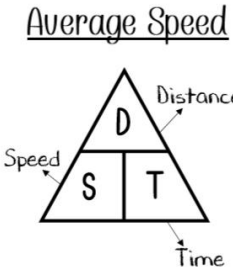
y = mx + c

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 ÷ time**	30 miles per hour
Density	**Density = mass ÷ volume**	6 g/litre
Pressure	**Pressure = force ÷ area**	N/m²

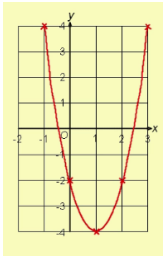




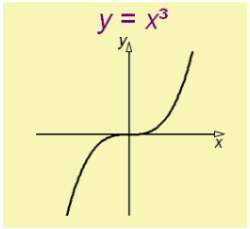
Maths Year 10 Foundation Autumn 2

Quadratic Graphs, Turning Points and Roots	**Squared**	To the **power 2**	4 **squared** means $4^2 = 4x4$
	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	**Simultaneous equations** are two **equations** with two unknowns. They are called simultaneous because they must both be solved at the same time. Use the **elimination method:** 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**	

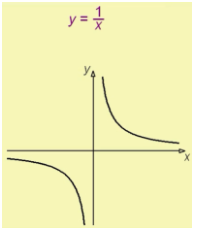
Further Graphs	**Cubic**	An **equation** with the highest power of x is x^3
	Reciprocal	An **equation** where x is in the **denominator**
	Numerator	The top number in a **fraction**
	Denominator	The bottom number in a **fraction**
	Direct proportion	As one quantity **increases,** so does another at the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



Quadratic Graph

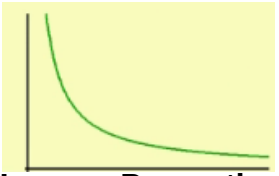


Cubic Graph



Reciprocal Graph

Direct Proportion Graph



Inverse Proportion Graph

Maths Year 10 Foundation Spring 1

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 U 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 $a \times 10^b$ $1 \leq a < 10$
10^8	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**
10^4	**Ten to the power four**, means 10 x 10 x 10 x 10 because the **power** is 4
10^3	**Ten Cubed**, means 10 x 10 x 10 because the **power** is 3
10^2	**Ten squared**, means 10 x 10 because the **power** is 2
10^1	**Ten to the power one,** just means 10 because the **power** is 1
10^0	**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** **$10^9 \div 10^7 = 10^{9-7}$** **$= 10^2$**

Maths Year 10 Foundation Spring 2

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 knows)	**1% = ÷ 100** **10% = ÷ 10** **5% = halve 10%** **20% = double 10%** **50% = ÷ 2** **25% = halve 50%** **75% = 50% + 25%**
	Percentage of an Amount	**(Amount ÷ 100) x Percentage** Example, find 30% of £210 (210 ÷ 100) x 30 = 2.1 x 30 = £63.00
	Convert percentage to decimal	**Decimal = percentage ÷ 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	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

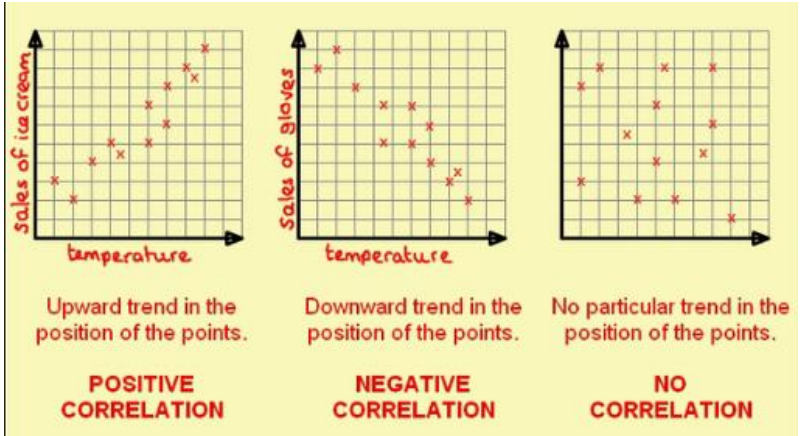
Ratio (Further)	**Ratio**	How much of one thing there is compared to another, usually written as 3 : 4
	Parts	The numbers in the **ratio, 3 parts : 4 parts**
	Simplify	Make the numbers smaller, **divide** by the **Highest Common Factor**
	Writing a Ratio as a Fraction	Each **part** of the **ratio** is 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)$^{\text{number of years}}$** Example £4000 saved for 3 years at 2% interest rate 2% = 0.02 as a **decimal** 1 + 0.02 = 1.02 4000 x 1.02^{3} = £4161.60

Maths Year 10 Foundation Summer 1

Statistics

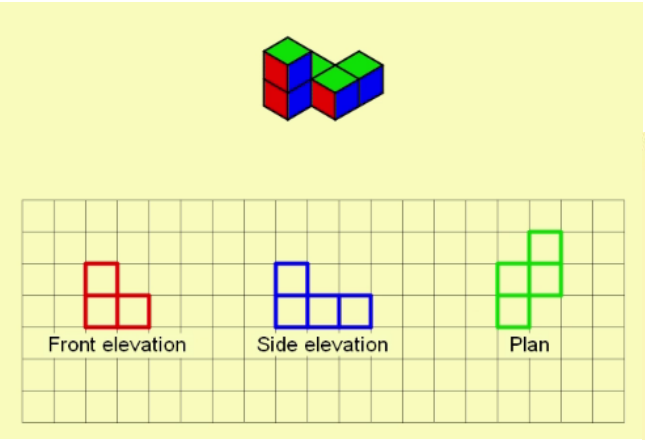
Data	Information that is collected
Quantitative Data	Numerical answers
Qualitative Data	Descriptive answers, for example eye colour
Discrete Data	Whole number answers, like how many people walk to school
Continuous Data	**Measured** on a **scale**, like **weight** or **height**
Primary Data	**Data** that you have collected
Secondary Data	**Data** that someone else has collected
Bar Chart	Shows **discrete data**, there are gaps between the bars
Pictogram	Shows **discrete data**, pictures are used to show **frequencies**, must have a **key**
Time Series Graphs	**Frequencies** plotted over time. Points are joined with straight lines
The Product Rule	Used to find the **intersection** of 2 or more **probabilities, eg. PA and PB = PA x PB**
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

Scatter Graphs	A graph of plotted points that compares two sets of information
Line of best fit	A line on your **scatter graph** that best describes the relationship between the two sets of data • 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
Correlation	The relationship between two variables
Positive Correlation	As one variable increases so does the other variable
Negative Correlation	As one variable increases the other decreases
No Correlation	No relationship between the two variables
Trend	A pattern in a set of results
Outliers	A point that is far from the **line of best fit**



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.**