MATHS KNOWLEDGE ORGANISER

Topic/Skill	Definition
NUMBER	
Integer	A whole number.
Positive	A number **greater than** zero
Negative	A number **less than** zero
Decimal place	The number of digits **after** the decimal point
Operations	**Symbols** and **words** used to show how to combine numbers
	x **Multiply** + **Add** ÷ **Divide** - **Subtract**
Sum	To **add** numbers together
Product	To **multiply** numbers together
Less than	A number which is **smaller** than another number is said to be **less than.**
Greater than	A number which is **larger** than another number is said to be **greater than.**
Round	Change a number to a simpler and easy to use value
Multiple	The result of multiplying a number by an integer. The **times tables** of a number.
Factor	A number that **divides exactly** into another number without a remainder. It is useful to write factors in pairs
Lowest Common Multiple (LCM)	The **smallest** number that is in the **times tables** of each of the numbers given.
Highest Common Factor (HCF)	The **biggest** number that **divides exactly** into two or more numbers.
Prime Number	A number with **exactly two factors**. A number that can only be divided by itself and one. The number **1 is not prime**, as it only has one factor, not two.
Square Number	The number you get when you **multiply a number by itself**.
Square Root	The **number you multiply by itself** to get another number. The reverse process of squaring a number.
Cube Number	The number you get when you **multiply a number by itself and itself again**.
Cube Root	The **number you multiply by itself and itself again** to get another number. The inverse process of cubing a number.

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Addition and subtraction with negatives	**Add positive** number is same as **add** + + means + **Subtract positive** number is same as **subtract** - + means - **Add negative** number is same as **subtract** + - means - **Subtract negative** number is same as **add** - - means +
Multiplication and division with negatives	**positive × positive = positive** positive ÷ positive = positive **positive × negative = negative** positive ÷ negative = negative **negative × positive = negative** negative ÷ positive = negative **negative × negative = positive** negative ÷ negative = positive
14. BIDMAS	**BRACKETS** **INDICES** **DIVISION** **MULTIPLICATION** **ADDITION** **SUBTRACTION**
15. Estimate	Round each number in the calculation to **1 significant figure.** $\approx$means 'approximately equal to'260
16. Share	This means to **divide** , so to share £36 between 10 people is $\frac{36}{10} = £3.60$
17. Product	The answer when two values are multiplied together
ALGEBRA	
1.Expand	Multiply out the bracket(s) $x(x+3) becomes\ x^2 + 3x$
2. Factorise	Put it back into brackets so $3a + 21a^2\ becomes\ 3a(1+7a)$
3. Simplify	Collect the "like" terms together. So $4x + 7q - x + 3q = 3x + 10q$

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4. Expression	A collection of terms which contain variables (letters) and numbers BUT NO EQUAL SIGN
5. Formula	An equation used to describe a relationship between two or more variables.
Geometry	
1. Diameter	The length of the line through the centre of the circle that touches two points on the edge of the circle. (Remember $d = 2r$ or the diameter is double the radius)
2. Radius	Is the length of the line though the centre of the circle that touches one point on the edge of the circle.
3. Gradient	How steep a line is, so the line $y = 3x + 5$ has a gradient of 3 and a y-intercept of 5.
4. Circumference	The perimeter of a circle $c = \pi d$
5. Perpendicular	Two or more likes which meet at right angles
6. Parallel	Two lines that never meet
7. Types of angles	**Acute** angle = an angle less than 90º **Right** angle = a 90º angle **Obtuse** angle = an angle more than 90º but less than 180º **Reflex** angle – an angle more than 180º
8. Area	The amount of space a shape takes up
9. Types of triangle	**Equilateral** All sides are the same length. Each internal angle is 60º **Right angled** Triangle that contains a 90º angle **Scalene** Triangle that has three different side lengths **Isosceles** Triangle that has two sides (and two base angles) the same.
10. Quadrilateral	A four sided polygon

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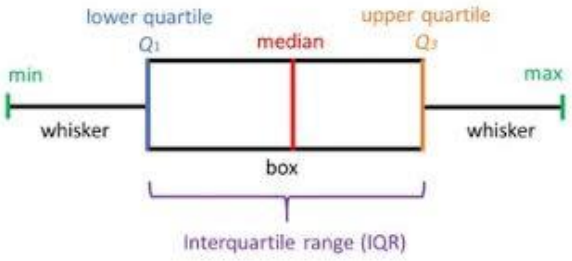
Topic/Skill	Definition
Sample	A selection taken from a larger group (known as the population) to help you find things about the larger group)
Population	The whole group that is being studied
Primary Data	Data that is collected by somebody from first hand sources using methods like surveys, interviews or experiments
Secondary Data	Data gathered from studies that have been run by other people or for other research
Discrete Data	Data that is counted and can only take certain values e.g. the number of students in a class
Continuous Data	Data can take any value (within a range) e.g. a person's height or a time in a race
Random Sample	A selection that is chosen randomly. Every member of the population being studied should have an equal chance of being selected
Stratified Sampling	Sampling method where total population divided into smaller groups (or subpopulations)
Cumulative Frequency	The 'running total' of the frequencies. Graph plotted at end points and forms an 'S' shape
Quartiles	Data is divided into quarters. Lower quartiles (LQ), Upper quartile (UQ)
Inter-Quartile Range (IQR)	Upper Quartile – Lower Quartile = Inter-Quartile Range
Box Plots	A diagram showing lowest value, LQ, Median, UQ & highest value 
Histograms	A way of representing data but unlike bar charts they show frequency density rather than frequency and often have bars of unequal width
Frequency Density	Frequency ÷ Class Width = Frequency Density

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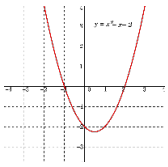
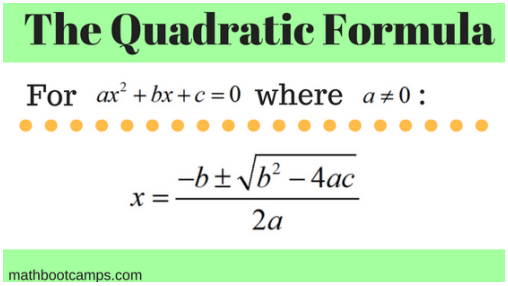
Topic/Skill	Definition
Quadratic	Highest exponent (or power) of the variable is a square e.g. $3x^2 + 5x = 0$
Graphs of Quadratic Functions	Parabola or 'u' shape 
Roots	Where a function equals zero. For quadratics this is often where the graph crosses the x-axis. (Can be found by factorizing quadratics)
Y-intercept	Where a line or curve crosses the y-axis
Turning Point	This is where the curve changes direction so the graph will change gradient from positive to negative and vice versa
Simultaneous Equations	Solving 2 equations that share variables. This can be done algebraically or graphically (where the lines/curves intersect)
Iteration	Repeating a process to solve more complex equations
Quadratic Formula	Formula used to solve complex quadratics that can't be factorised: 

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Topic/Skill	Definition
Identify & Draw parts of a circle	This will include sector, segment, tangent, chord, radius, diameter & circumference
Prove & Use Circle Theorems	The angle at the centre of a circle is twice the angle at the circumference
	The angle in a semi-circle is always 90^o
	Angles in the same segment are always equal
	Alternate segment theorem – Angle between a chord and a tangent is equal to the angle in the alternate segment
	Opposite angles of cyclic quadrilateral sum to 180^o
	The perpendicular from the centre of a circle to a chord bisects the chord
	Angle between a tangent and radius is 90^o
	Tangents from a common point are equal in length

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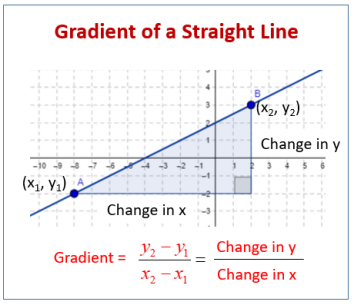
Topic/Skill	Definition
Equation of a circle	$(x-a)^2 + (y-b)^2 = r^2$
Gradient	How steep a line is. 
Perpendicular Lines	If two lines are perpendicular then their gradients multiply to give –1. Referred to as the negative reciprocal
Find the length of a line segment	Use given coordinates and Pythagoras Theorem to calculate the length of a line
Circle Theorem	Angle between a tangent and radius is 90°

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