Mathematics Knowledge Organiser

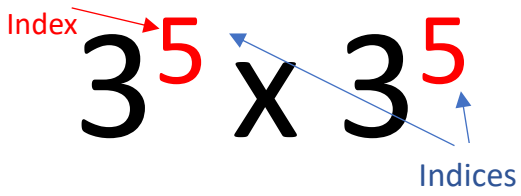
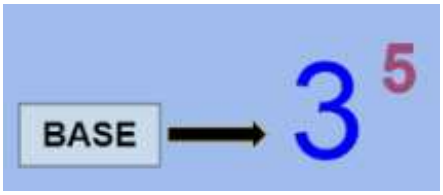
Year 8 – Autumn T1

‘Laws of indices’

The Knowledge for Progression:

- To know that anything to the power of zero equals 1.
- To know that anything to the power of 1 is itself.
- To know that to simplify is to reduce to lowest form.
- To know that the base value is the value that is being raised to a power.
- To know that an index (indices plural) is the value that tells you how many times to multiply the base by itself.

Speak Like a Mathematician

Key Word	Dual Coding	Definition
Simplify		Reduce to lowest simplest form
Indices		Indices is plural for index. The number that tells you how many times to multiply the base by itself
Base		The value that is being raised to a power

‘Standard form’

The Knowledge for Progression:

- To know that standard form is an alternative way to express large and small numbers.
- To know that standard form has a set notation $'a \times 10^n'$ where $'a'$ is a number $1 \leq a < 10$ and $'n'$ is an integer.

Speak Like a Mathematician

Key Word	Dual Coding	Definition
Standard form	Standard form is written in the form $a \times 10^n$. Where a is $1 \leq a < 10$ and n is any positive or negative number	An alternative number system to express large and small numbers

‘Rounding and estimating’

The Knowledge for Progression:

- To know that we round to make a number simpler whilst keeping its value close to what it was.
- To know that the first significant figure of a number is the first non-zero digit of that number.
- To know that an estimation uses rounded values to calculate the answer.

Speak Like a Mathematician

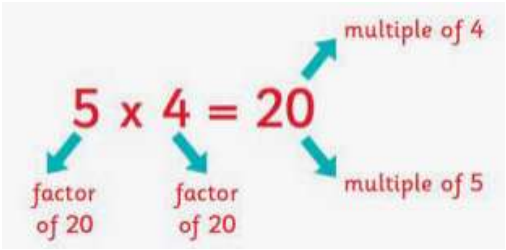
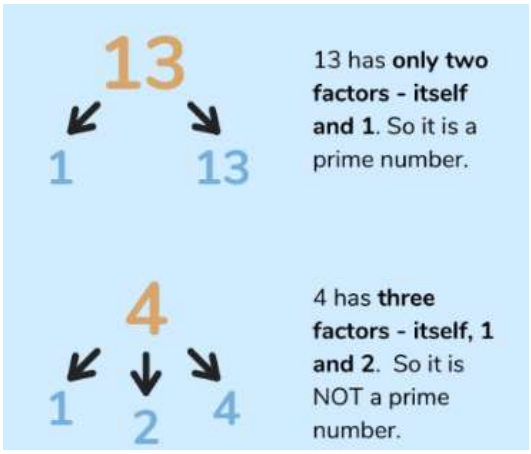
Key Word	Dual Coding	Definition
Round		Making a number simpler but keeping the value close to what it was
Significant Figure	 	The most important figures (digits) to signify the size of the number
Approximate		To estimate a number, amount or total by rounding

‘Factors, multiples, and primes’

The Knowledge for Progression:

- To know that a factor is a value that divides without remainder.
- To know that a multiple is the repeated multiplication of a number.
- To know that a prime number is an integer with only 2 factors, 1 and itself.
- To how that the highest common factor (HCF) is calculated by multiplying the values in the intersection of the Venn diagram.
- To how that the lowest common multiple (LCM) is calculated by multiplying all the values in the Venn diagram.

Speak Like a Mathematician

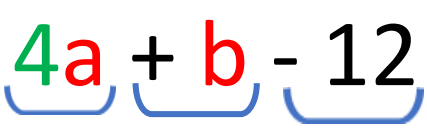
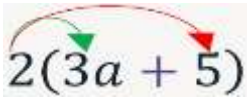
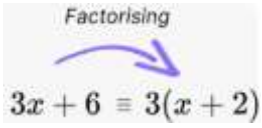
Key Word	Dual Coding	Definition
Factor		A value that divides without remainder
Multiple		Repeated multiplication of a value
Prime		An integer with only two factors, one and itself

‘Algebraic manipulation’

The Knowledge for Progression:

- To know that terms are a constant, variable or combination of both and can be positive or negative. The 4 operations can be applied in the same way as numerical operations.
- To know that an expression is made up of constants, variables, and mathematical operations, but does not include an = sign.
- To know that a formula describes a mathematical relationship between variables.
- To know that expanding means the removal of brackets by multiplication.
- To know that factorising is a way of writing an expression as the product of its factors using brackets.
- To know that a quadratic expression is in the form of $x^2 + bx + c$.

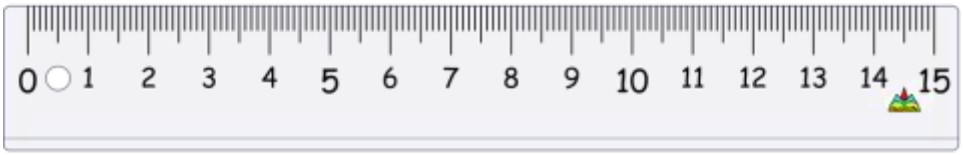
Speak Like a Mathematician

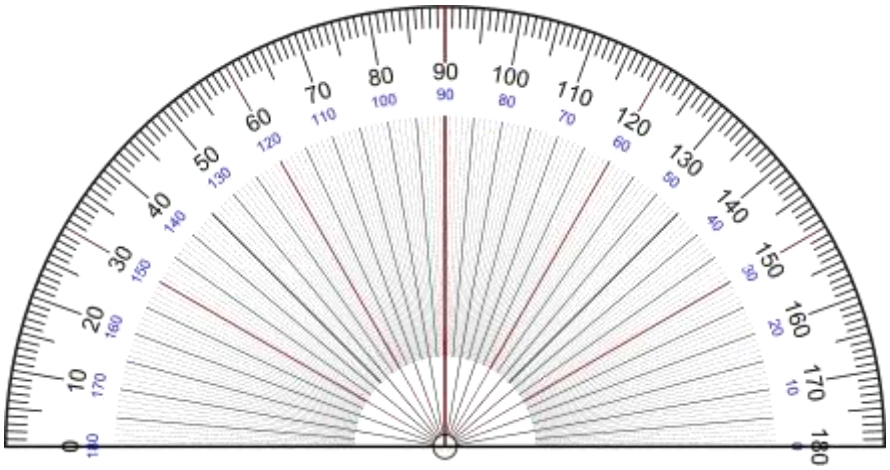
Key Word	Dual Coding	Definition
Variable		A letter or a symbol representing a numerical value
Coefficient		A numerical value that comes before a variable
Term		A constant, variable or combination of both
Expression	4a + b - 12	Made up of constants, variables, and mathematical operations
Linear Expression	2y + 3	A first order expression, it has no variable with an exponent higher than one
Quadratic Expression	$2y^2 + 3y + 8$	A second order expression, which is in the form $ax^2 + bx + c$
Equation	4a + b – 12 = 32	Two expressions connected by an equal symbol
Formula	$S = \frac{D}{T}$	Describes a mathematical relationship between variables
Expand		The removal of brackets by multiplying
Factorise		A way of writing an expression as the product of its factors using brackets

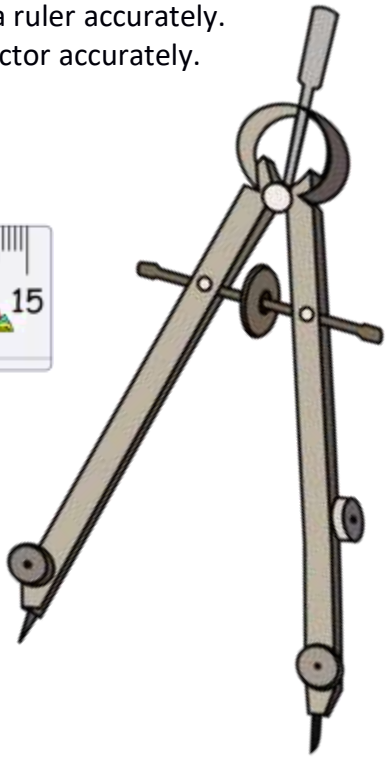
‘Constructions’

The Knowledge for Progression:

- To know how to measure and draw line segments with a ruler accurately.
- To know how to measure and draw angles with a protractor accurately.
- To know how to use a compass accurately.







Mathematics Knowledge Organiser

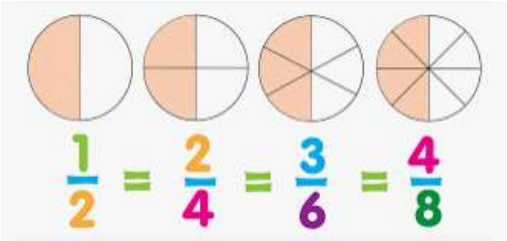
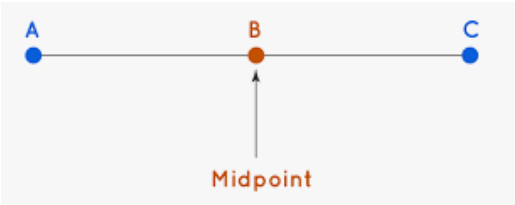
Year 8 – Autumn T2

‘Calculations with fractions’

The Knowledge for Progression:

- To know that a fraction a numerical value that is not an integer.
- To know that the numerator is the top value of a fraction.
- To know that the denominator is the bottom value of a fraction.
- To know that a mid-point is the middle value.

Speak Like a Mathematician

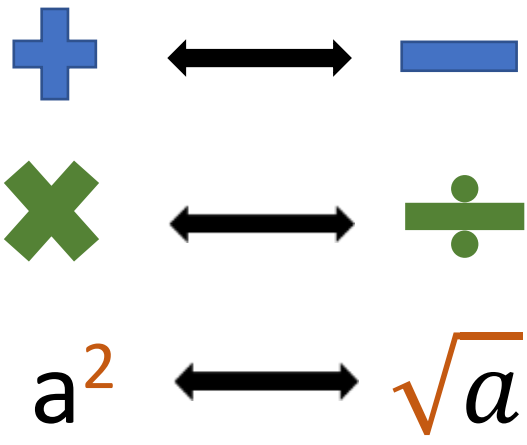
Key Word	Dual Coding	Definition
Fraction		How many parts of a whole we have
Midpoint		The middle between two values

‘Solving equations and inequalities’

The Knowledge for Progression:

- To know that an equation contains an equals symbol, variable and constant.
- To know that an inequality contains an inequality symbol, variable and constant.
- To know that equation/inequality are formed from expressions.
- To know that solve means to find the value of the variable.
- To know that solving always requires performing the inverse operations.

Speak Like a Mathematician

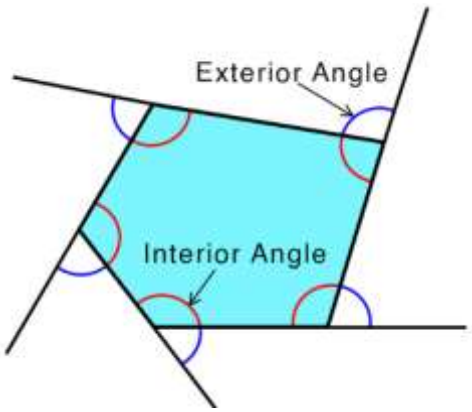
Key Word	Dual Coding	Definition
Equation	$4a + b - 12 = 32$	Two expressions connected by an equal symbol
Inequality	$4a + b - 12 > 32$	Two expressions connected by an inequality symbol
Solve	$\frac{x}{5} = 6$ $x = 30$	Find the value of the variable
Inverse		Opposite operations that reverse the effect of the other operation

‘Angles in polygons’

The Knowledge for Progression:

- To know that the sum of interior angles is calculated by (n-2) x 180°, where n is the number of sides of the polygon.
- To know that sum of the interior angle and the exterior angle equal 180°.

Speak Like a Mathematician

Key Word	Dual Coding	Definition
Interior angle		The angle that lies within a polygon.
Exterior angle		An angle formed outside the polygon.