Mathematics Knowledge Organiser

Year 9 – Autumn T1

‘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.

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.

‘Vector arithmetic’

The Knowledge for Progression:

- To know that a translation is horizontal and vertical movement of a shape.
- To know that a column vector describes a movement e.g. ADD VECTOR.
- To know that the top value of a column vector represents the horizontal movement.
- To know that the bottom value of a column vector represents the vertical movement.
- To know that movements up and down are represented by a positive value.
- To know that movements left and down are represented by a negative value.

Speak Like a Mathematician

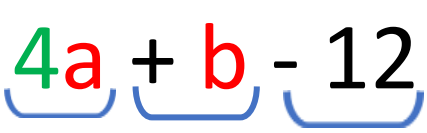
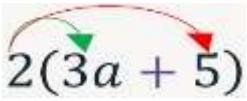
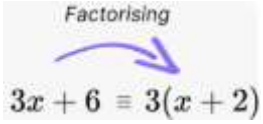
Key Word	Dual Coding	Definition
Column vector	$\begin{pmatrix} 3 \\ 2 \end{pmatrix}$ is $\begin{pmatrix} 3\ right \\ 2\ up \end{pmatrix}$	Describes the movement of a translation

‘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 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 $ax^2 + bx + c$.

Speak Like a Mathematician

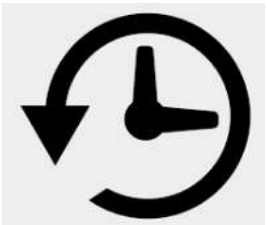
Key Word	Dual Coding	Definition
Variable		A letter or a symbol representing a numerical value.
Coefficient		A numerical value that comes before a variable.
Term		A constant, variable or combination of both.
Expression	4a + b - 12	Made up of constants, variables, and mathematical operations.
Linear Expression	2y + 3	A first order expression, it has no variable with an exponent higher than one.
Quadratic Expression	$2y^2 + 3$	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.

‘Speed, distance and time’

The Knowledge for Progression:

- To know 15 minutes = 0.25 hours.
- To know 30 minutes = 0.5 hours.
- To know 45 minutes = 0.75 hours.
- To know speed is a compound unit.
- To know speed can be measured in miles/h, km/h and m/s.
- To know $Speed = \frac{Distance}{Time}$.
- To know $Distance = Speed \times Time$.
- To know $Time = \frac{Distance}{Speed}$.

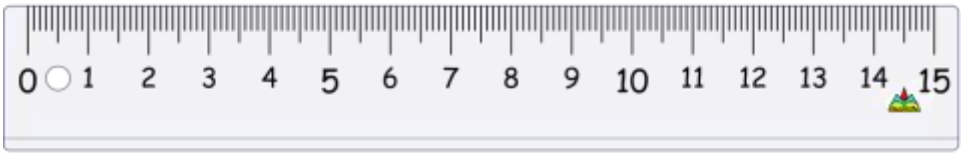
Speak Like a Mathematician

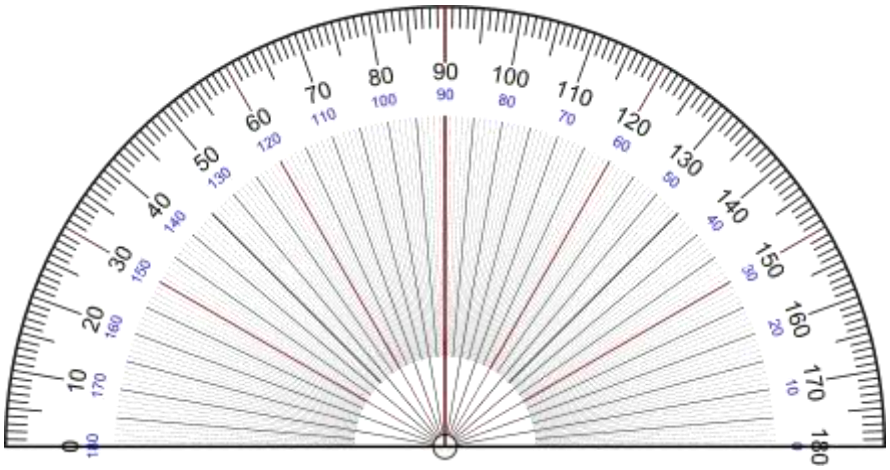
Key Word	Dual Coding	Definition
Speed	 Per 	The rate of distance travelled per unit of time
Compound unit		A measurement that requires two different types of units

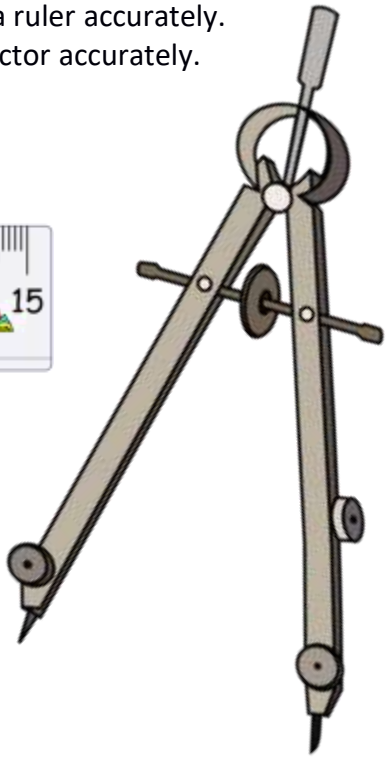
‘Constructions’

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 9 – Autumn T2

‘Percentages’

The Knowledge for Progression:

- To know that multipliers are percentages expressed in decimal form
- To know that any original amount is 100%

Speak Like a Mathematician

Key Word	Dual Coding	Definition
Percentage	$13\% = \frac{13}{100}$	Per one hundred
Multiplier	$25\% \equiv 0.25$ $140\% \equiv 1.4$	The equivalent decimal to a percentage

‘Solving equations and inequalities’

The Knowledge for Progression:

- To know that an equation contains an equal’s 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.

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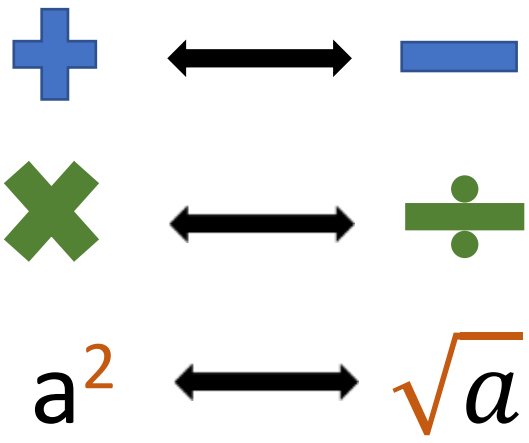
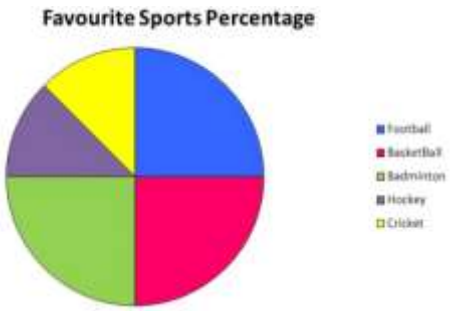
Key Word	Dual Coding	Definition
Equation	$4a + b - 12 = 32$	Two expressions connected by an equal symbol.
Inequality	$4a + b - 12 > 32$	Two expressions connected by an inequality symbol.
Solve	$\frac{x}{5} = 6$ $x = 30$	Find the value of the variable.
Inverse		Opposite operations that reverse the effect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

‘Pie Charts’

The Knowledge for Progression:

- To know that there are 360° in a circle.
- To know that a protractor is used to measure angles.
- To know that a pie chart shows the proportion of each section to the whole.
- To know that 90° is ¼ of a circle, 180° is ½ of a circle.

Speak Like a Mathematician

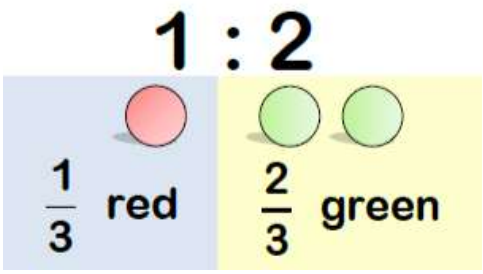
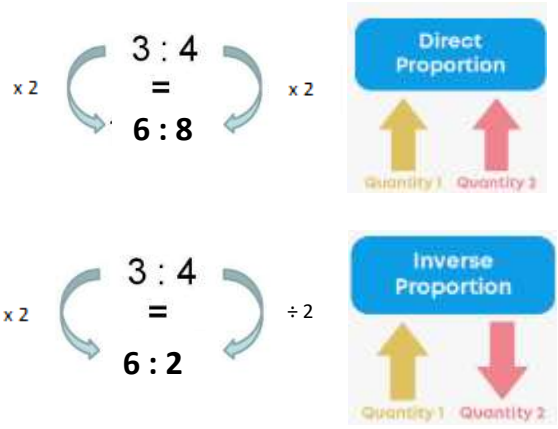
Key Word	Dual Coding	Definition
Pie Chart		A type of graph in which a circle is divided into sectors to represent data.
Sector		The region within a circle bounded by two radii and one of the arcs they cut off

‘Ratio and Proportion’

The Knowledge for Progression:

- To know that a ratio is a comparison of two or more quantities in relation to each other.
- To know that a fraction is an example of a type of ratio where the denominator represents the whole and numerator 1 of the parts.

Speak Like a Mathematician

Key Word	Dual Coding	Definition
Ratio		A part-to-part comparison
Proportion		A mathematical relationship, where quantities are increasing or decreasing in the same ratio