**Year 8 Higher Learn By Heart
January Assessment**

Extending your knowledge of year 8 Maths!

Top Tips:

* Use look, cover, write, check to learn the facts.
* Get someone to read the facts pausing at the bold words, do you know what comes next?
* Use a blank grid and see how much you can fill out with only the pictures to give you hints
* Make up questions to test yourself or get someone to test you on the facts.
* Once you know the facts, try to apply your knowledge using revision questions or Sparx.

**Higher Learn By Heart: Ratio**

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| 1 : □ | To compare ratios it is useful to write them in the form **1:n** or n:1.When using this form, **n can be any number** including a fraction or decimal.  |
|  | The **radius** is the distance from the centre to the edge of a circle |
|  | The **diameter** is the distance all the way across a circle through the centre |
| Arrow circle outline | The **circumference** is the distance all the way around the edge of the circle |
| π | The symbol π is called **pi** and represents the irrational (never-ending) number 3.14159… |
| C = | The ratio of the diameter to the circumference of the circle is always 1: π so **C = π x d**. |
|  | **Gradient** tells us how steep a line is. It is the ratio of the base to the height of a triangle drawn under the line.  |
|  | To find the gradient work out how many squares you go up for every one you go across using $\frac{height}{base}$ |

**Higher Learn By Heart: Multiplicative Change**

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| 3.1 J) Direct & Inverse Proportion Graphs – Proportion – OCR GCSE Maths  Higher - Elevise | A **direct proportion** graph must start at **(0,0)** and be a **straight line.**  |
| $$1:100000$$$$1cm :100000cm$$1cm : 1000m1cm : 1km | A **map scale** needs to show **large distances**. Common scales are 1:50000 and 1:25000. **No units** are given so use the same units on both sides then **convert** the real-life side to a more sensible unit. |
|  | When working with **similar shapes** we use scale factors to show what we multiply the lengths by. If moving from a **larger** shape to a **smaller** shape the scale factor will be a **fraction or decimal** less than 1 |

**Higher Learn By Heart: Multiplying and Dividing Fractions**

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| $$1\frac{1}{2}×2\frac{1}{5}$$$$\frac{3}{2}×\frac{11}{5}$$ | To **multiply or divide mixed numbers** – **change to improper** fractions first.Don’t forget to change your answer back into a mixed number. |
| 4t | **Multiplication** signs are **not used** in algebra:4 x t = 4tt x t = t2 |
| $$\frac{2x}{5}$$ | **Division** in algebra is written as a **fraction** |
| $$\frac{x}{2}÷\frac{x}{5}$$ | For **algebraic fractions**, you just use all the **same** methods as numerical fractions.  |

**Higher Learn By Heart: Cartesian Plane**

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|  | A **linear graph** makes a **straight line** when plotted. |
|  | A **non-linear** graph does **not** make a **straight** line when plotted.  |
|  |  A linear graph has an equation of the form $y=mx+c$The $m$ **is the gradient**, it tells us how steep the line is (check unit 1 LBH) The $c$ **is the** $y$ **-intercept**, it tells you where the graph crosses the $y$ axis. |

**Higher Learn By Heart: Representing Data**

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|  | An **outlier** is a point that is far away from the other points and **does not fit the pattern** of correlation, suggested by the other points. |
| Understand Interpolation and Extrapolation in Scatter Diagrams Worksheet -  EdPlace | The line of best fit should only be used for predicting the second value if the value of the first variable lies **within the data range** of the scatter graph. This is known as **interpolation**.  |
| Understand Interpolation and Extrapolation in Scatter Diagrams Worksheet -  EdPlace | If the value of the first variable lies **outside the data range** given by the scatter graph, then using the line of best fit for predicting the value of the second variable is **unreliable**. This is known as **extrapolation**.  |
|  | In **non-linear** correlation, there is a relationship between the 2 variables but it’s just not linear. Therefore, we would **not** be able to draw a **straight** line of best fit. |

**Higher Learn By Heart: Probability**

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| ξ | The ξ symbol represents the universal set. This contains all the values of the set.  |
|  | The set **Q’,** is the list of all the values or numbers **outside** Q. It is called the **complement** of Q.  |
|  | **P ∩ Q** means write the values or numbers which overlap or are **common** to both P **and** Q. It is called the **intersection** of P and Q. |
|  | **P U Q** means write **all** the values or numbers which are inP **or** Q or both. It is called the **union** of P and Q. |
| *m x n*  | If there are **m** options for a first choice and **n** options for a second choice, then there are **m x n** combinations created when making both choices. This is called the **product rule for counting**. |
| *a x b x c x…* | The **product rule** can be **extended** to 3 or more things to select. e.g if there are 3 starters, 4 main courses and 2 desserts to choose from, in total there are$ 3 × 4 × 2 = 24$ possible meal choices. |

**Higher Learn By Heart: Sequences**

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|  **5n + 6 = ?** | To decide if a number is in a sequence, set up and solve and equation with **‘n’th term = number**. If there is an **integer** answer for n then the number is in the sequence (at position n). |

**Core Learn By Heart: Brackets, Equations and Inequalities**

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| FOIL | When expanding double brackets such as (y + 10)(y + 3) we can use the FOIL method: **First, Outer, Inner, Last** |
| Solving equations with unknown on both sides | When an equation has **variables on both sides** the first step is to eliminate the variable with the **lowest** co-efficient |
|  | If we multiply or divide a **positive** number **and a negative** number the answer will be **negative**.If we multiple or divide **two negative numbers** the answer will be **positive**. |