Maths

Teacher Tips

The key to success in Maths is regular practice. I.e. **doing questions**. Use the ideas below to help you with this:

- Maths Clinic – this runs every Thursday after school for an hour.
- Yellow Sheets – show all of your workings each week and aim to learn a bit more each time.
- Corbett Maths - www.corbettmaths.com – Worksheets, videos and 5-a-day – Online revision tool to help you to revise 'little and often'.
- Maths Genie https://www.mathsgenie.co.uk/ – A great place for topic based questions and videos to help you.
- Mr Carter Maths https://mrcartermaths.com/ - Username: student@hb Password: HenryBMaths – The perfect site for doing lots of practise (topic based questions and answers).
- Mathswatch – Use your account to revise independently. By year 11 you'll have a great picture of what you know and what you need to revise.

Sites for those interested in mathematics

- Brilliant.org – great puzzles on all maths topics
- Numberphile – youtube channel with loads of interesting maths videos
- Nrich – Interesting maths puzzles
- Desmos – Graphing calculator
- Dr Frost Maths – Sign up and learn.
- OnMaths.com – past papers.

Maths

Year 7: Paper 1 – Non Calculator

Easier topics	**Harder topics**

Year 7: Paper 2 - Calculator

Easier topics	**Harder topics**

The boxes labelled 'easier topics' and 'harder topics' are to be filled with hints from your Maths Teacher before each assessment you take at the Henry Beaufort School. Your teacher will tell you 5 'easier topics' and 5 'harder topics' which are going to be in your assessment. This gives you an opportunity to make your revision as impactful as possible.

Maths

Year 7: Paper 3 – Non Calculator

Easier Topics	**Harder Topics**

Year 7: Paper 4 – Calculator

Easier Topics	**Harder Topics**

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Maths

Year 8: Paper 1 – Non Calculator

Easier Topics	Harder Topics

Year 8: Paper 2 – Calculator

Easier Topics	Harder Topics

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Maths

Year 8: Paper 3 – Non Calculator

Easier Topics	**Harder Topics**

Year 8: Paper 4 – Calculator

Easier Topics	**Harder Topics**

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Maths

Year 9: Paper 1 – Non Calculator

Easier Topics	Harder Topics

Year 9: Paper 2 – Calculator

Easier Topics	Harder Topics

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Maths

Year 9: Paper 3 – Non Calculator

Easier Topics	**Harder Topics**

Year 9: Paper 4 – Calculator

Easier Topics	**Harder Topics**

The boxes labelled 'easier topics' and 'harder topics' are to be filled with hints from your Maths Teacher before each assessment you take at the Henry Beaufort School. Your teacher will tell you 5 'easier topics' and 5 'harder topics' which are going to be in your assessment. This gives you an opportunity to make your revision as impactful as possible.

Maths

Data Handling

Pie Chart

Favourite Crisps	Frequency	Degrees
Salted	34	3 X 34 = 102
Roast Chicken	16	
Salt & Vinegar	21	
Cheese & Onion	18	
BBQ	31	
Total	120	360

Number of Degrees per person = 360 ÷ 120 = 3
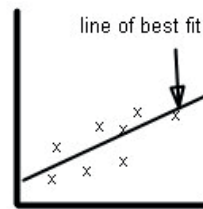
Scatter Diagram

Frequency Polygon

Always plot midpoint against frequency

Mean from a table

Goals scored	Frequency	Goals x frequency
0	3	0
1	4	4
2	2	4
3	1	1
Total	10	9

$$\text{Mean} = \frac{9}{10} = 0.9 \text{ goals per game}$$

Frequency tables can lead to lots of different frequency diagrams such as Bar Charts, Pie Charts and Frequency Polygons. Later in your studies Frequency Tables will lead to Cumulative Frequency Diagrams and Histograms.

Maths

Data Handling continued

Stem and Leaf diagram

Key: 1|4 means 14 passengers

```
0 | 7  9
1 | 4  5  6  8  8
2 | 1  3
3 | 0
```

Range = 30 – 7 = 23
Median = middle of the 2 middle values = 17
Mean = (7+9+14+15+16+18+18+21+23+30)/10 = 17.1
Mode = Most common = 18

Correlation is the connection between 2 variables (on a scatter diagram)

Positive correlation   Negative correlation   No correlation

Averages

Mean : Add them all up and divide by how many numbers there are.
Median: Put them in order and find the middle value.
Mode: The one that occurs the most (modal group is the group that occurs the most).

Measure of Spread

Range: Highest value subtract the lowest value.

Probability Always an answer between 0 and 1

0 _____ 1

Must be written as a fraction, decimal or percentage
NEVER as a ratio.

Relative frequency is another word for probability.

The more times you carry out an experiment the more accurate the outcomes are.

Maths

Geometry

Angles

0° up to 90° are acute angles
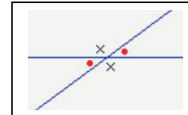A right angle is 90°
90° to 180° are obtuse angles
Angles bigger than 180° are reflex angles
Angles on a straight line add up to 180°
Angles in a triangle add up to 180°
Angles around a point add up to 360°

When 2 straight lines cross, the vertically opposite angles are equal

Triangles

Equilateral: All sides equal length. All angles = 60°
Isosceles: 2 sides of equal length / 2 angles equal
Right angled: Has 1 right angle (90°)
Scalene: All sides different lengths, all angles different

Congruent shapes are identical, same lengths sides and equal angles
Similar shapes are enlargements of each other. Same angles but different side lengths.

Perimeter is the distance around the edge of a shape, *measured in mm, cm, m or km*

Area is the space inside a shape, *measured in mm², cm², m², km²* (learn the formulae for area)

Volume is the amount of space inside a 3D shape, *mm³, cm³, m³, km³* (learn the formulae for vol)

Polygons

Number of sides	Name	Sum of interior angles
3	Triangle	180
4	Quadrilateral	360
5	Pentagon	540
6	Hexagon	720
7	Heptagon	900
8	Octagon	1080
9	Nonagon	1260
10	Decagon	1440

Maths

Geometry continued

Interior angle + Exterior angle = 180°

For any polygon the exterior angles add up to 360°. A single exterior angle for a **regular polygon** can be found by **dividing 360 by the number of sides.**

The sum of **the interior angles** of a polygon is **(number of sides - 2) x 180°**

Transformations
Rotation (turning), **Reflection** (mirroring/flipping), **Enlargement** (getting bigger or smaller), **Translation** (moving the shape up, down, left, right)

When a shape is enlarged the sides change size but **the angles stay the same**

Enlarging by scale factor 2 means get twice as big
Enlarging by scale factor ½ means get half as big

A vector is used for translations:

$$\begin{pmatrix} 3 \\ -2 \end{pmatrix}$$ 3 right
2 down

Measures

Length   10mm = 1cm
              100cm = 1m
              1000m = 1km

Weight   1000g = 1kg

Capacity   1000ml = 1litre
              $1cm^3 = 1ml$

Converting between area measurements

Area = 1 x 1 = 1m²   Area = 100 x 100 = 10000cm²
So 1m² = 100 00cm²

Maths

Number

Integer means whole number

Factor is a number that goes into another number (factors of 12 are [1, 12] [2, 6] [3, 4])

Multiples are the numbers in that times table (multiples of 12 are 12, 24, 36…)

Prime numbers are numbers with exactly 2 distinct factors (2, 3, 5, 7, 11, 13….)

Square numbers come from a number multiplied by itself 1x1=**1**, 2x2=**4** etc
Square numbers are 1, 4, 9, 16, 25, 36, 49, 64, 81, 100…..

Square root is the number that you started with to get the square number (the square root of 25 is **5** because 5x5=25)

Cube numbers come from a number multiplied by itself 3 times 1x1x1=**1**, 2x2x2=**8** 3x3x3=**27** etc

Any number **to the power of 0** = 1   e.g. $3^o = 1$, $x^o = 1$, $25^o = 1$

A Percentage is a fraction over 100 ($\frac{23}{100} = 23\%$)

Reciprocal is a number turned upside down reciprocal of $\frac{1}{3}$ is $\frac{3}{1}$ (or just 3), reciprocal of 4 is $\frac{1}{4}$

Calculations must be done in the correct order **BIDMAS** (brackets, indices, [*division, multiplication*], [**addition, subtraction**]) Multiplication and division are paired and should be worked out from left to right. Addition and subtraction are paired and should be worked out from left to right.

Algebra

An **Equation** has an = sign and can be solved i.e.   3x +1 = 19

A **Formula** has an = sign and cannot be solved, but can be used to work out the value of one of the variables i.e.   V = IR

An **Expression** has no = sign i.e. 3x + 2xy or 2x + 5

Expand means multiply out the bracket. i.e. $3(x + 5) \equiv 3x + 15$

Factorise means find the factors to put the expression into brackets i.e. $3x + 15 \equiv 3(x + 5)$