

## Curriculum Intent

Mathematic teachers are striving for all students to be successful and enjoy the subject, irrespective of their prior experience. Students will be encouraged to see the link between topics across the curriculum, as well as their application to problems, which can include a real-life emphasis.

Students are being prepared for studying the subject at GCSE, in the Sixth Form and beyond. They will appreciate its relevance to the world of work, in particular, where problem-solving strategies are needed to tackle tasks where the correct approach is not immediately clear.

As well as being knowledgeable with their application, students will need to adopt a risk-taking approach in order to make an initial attempt. They will need to be reflective of the solution, or progress made towards one, and ensure their final answer is communicated in a mathematically coherent manner.

## Autumn Term | Sequences | Forming and solving equations & inequalities Linear graphs | Accuracy and estimation

### Sequences

Generating terms of a linear sequences  
Generating terms of a non-linear sequences  
Identifying different types of linear and non-linear sequences  
Finding a given term in a linear sequence  
Developing a rule for finding a term in a linear sequence  
Generalising the position to term rule for a linear sequence (nth term)

### Linear graphs

Identify the equations of horizontal and vertical lines (from year 7)  
Plot coordinates from a rule to generate a straight line  
Develop a rule into an algebraic representation  
Develop concept of gradient using graphs of the form  $y=ax+b$  and then equations of the form  $y=ax+b$   
Identify key features of a linear graph including the y-intercept and the gradient  
Make links between the graphical and the algebraic representation of a linear graph  
Recognise different algebraic representations of a linear graph  
Identify parallel lines from algebraic representations

### Accuracy and estimation

Round numbers to a required number of decimal places  
Round numbers to a required number of significant figures  
Identify rounding errors  
Estimate quantities in a variety of contexts including area and perimeter  
Identify and reason if an estimate is an over- or under-estimate

### Forming and solving equations & inequalities

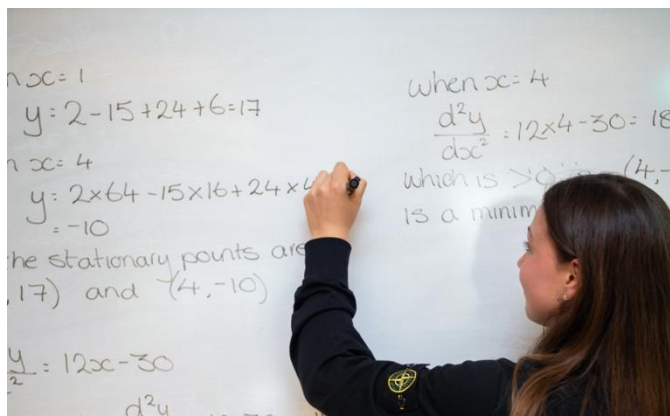
Classifying expressions, equations, inequalities and identities  
Deriving equations from different contexts  
Solving linear equations with an unknown on one side (revise from Year 7)  
Solving linear equations with an unknown on both sides  
Solving equations involving fractional terms and brackets  
Interpreting the solution to an equation based on the context from which it is derived  
Interpreting relationships expressed as inequalities (revise from year 7)  
Deriving inequalities from contexts  
Forming and solving inequalities with unknown on one side  
Forming and solving inequalities with an unknown on both sides  
Representing a solution on a number line

### How is homework used to enhance learning?

- Homework book
- Eedi
- Review exercise
- Exam Style questions

### What does Excellence look like?

- Use fractions, decimals and negative in the data to find averages.
- Use algebra to find a number given the mean.
- Angles in a full circle – part of a circle, arcs and sectors.
- Find areas of circles and round the answer.
- Rearranging equations.
- Substitution into formula.
- Sequences
- Ratio
- Scatter graphs
- Graphs – gradient Solving equations
- Bar modelling.
- Types of shapes and properties of shapes.
- Converting units.
- Graphs.
- Negative, fraction and decimal numbers
- Properties of shapes particularly parallelograms.
- Solving equations.
- Interior angles formula.



### Univariate data

Find the mean, median mode and range from raw datasets  
 Use the mean, median and mode to compare data sets  
 Use an average plus the range to compare datasets  
 Find the mode, median and mean from tables and graphical representations (not grouped)  
 Explore methods of data collection including surveys, questionnaires and the use of secondary data  
 Appreciate the difference between discrete and continuous data  
 Classify and tabulate data  
 Conduct statistical investigations using collected data

### Bivariate data

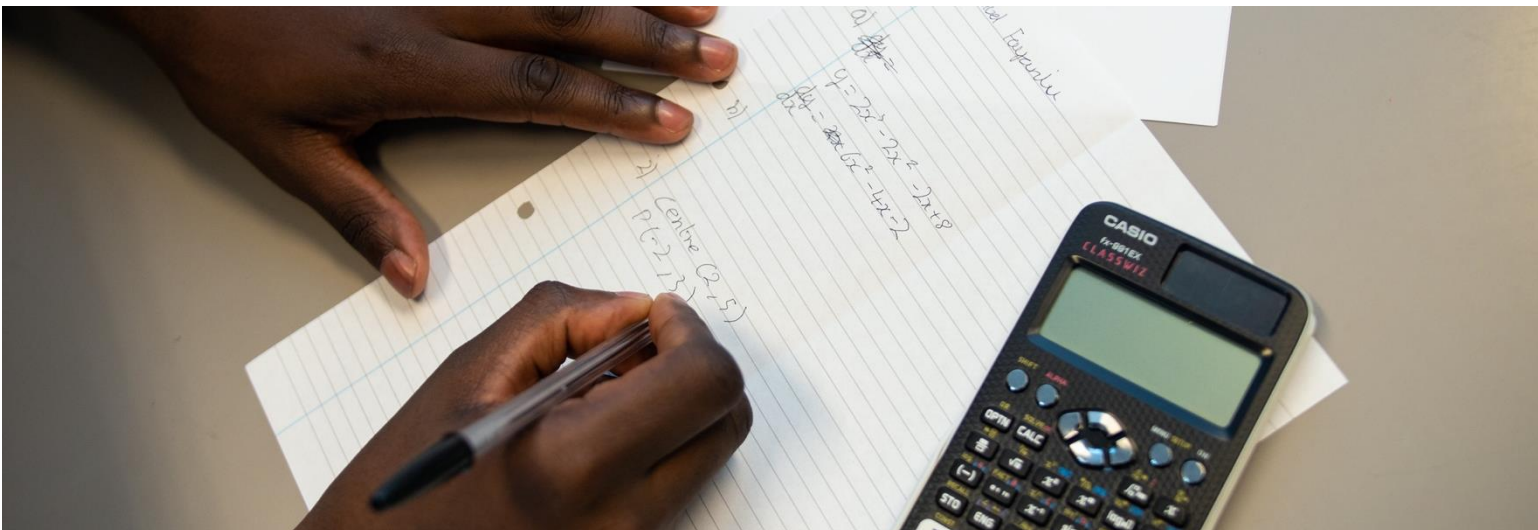
Construct scatter graphs  
 Examine clusters and outliers  
 Analyse the shape, strength and direction to make conjectures for possible bivariate relationships  
 Using range, mean, median and mode to investigate the characteristics of data and to compare to sets of data  
 Use a scatter graph to plot a line of best fit  
 Use a line of best fit to interpolate and extrapolate inferences

### Direct and inverse proportion

Explore contexts involving proportional relationships  
 Represent proportional relationships using tables and graphs  
 Represent proportional relationships algebraically  
 Understanding about graphs of proportional relationships  
 Solve proportion problems  
 Meaning and properties of inverse proportional relationships  
 Investigate constant area as a context for indirect proportion  
 Represent inverse proportion relationships algebraically

### Ratio, real life graphs and rates of change

Use ratio notation to describe a multiplicative relationship between two quantities (revise from year 7)  
 Solve problems involving ratios (revise from year 7)  
 Explore ratios in different contexts including speed and other rates of change  
 Contrast ratio relationships involving discrete and continuous measures  
 Use speed and other rates of change to draw and interpret graphical representations  
 Explore density and concentration as other contexts for proportional relationships



### Circles

Explore relationship between circumference and diameter/radius  
 Formula for circumference  
 Explore relationship between area and radius  
 Formula for area of a circle  
 Area and circumference of a semi-circle and other sectors  
 Area and perimeter of composite shapes involving sectors of circles

### Bearings

Introduce conventions for drawing and measuring bearings  
 Plot and measure the position of an object on a given bearing and distance from a specified point  
 Solve problems involving bearings using angle rules from previous units

### Volume and surface area of prisms

Naming prisms, nets of prisms and using language associated with 3-D shapes  
 Finding the volume and surface area of cuboids  
 Finding the volume and surface area of other prisms including cylinders  
 Finding the volume and surface area of composite solids  
 Solving equations and rearranging formulae  
 Convert between different units of area and volume

### Angles in polygons

Know the sum of interior angles of a triangle and use to solve angle problems (revise from Year 7)  
 Explore different methods for finding the sum of the interior angles of polygons by splitting the shape into triangles  
 Generalise different methods for finding the sum of interior and define the sum of the exterior angles of a polygon  
 Use the sum of the interior and exterior angles of a polygon to solve problems

## International Opportunities

### Within the curriculum

History of fractions <https://nrich.maths.org/2515>

Tasks for fractions [https://nrich.maths.org/public/topic.php?group\\_id=2&code=19](https://nrich.maths.org/public/topic.php?group_id=2&code=19)

Al-Khwarizmi Born 830AD Developed Algebra

Muslim mathematician and astronomer whose major works introduced Hindu-Arabic numerals and the concepts of algebra into European mathematics.

Fibonacci sequence – The magic of Fibonacci numbers Arthur Benjamin – TED talk

Sequence within voting systems – resource within the international folder.

Leonhard Euler 1707 – 1783 A Swiss mathematician who developed notation including the use of  $\pi$ .

Srinivasa Ramanujan 1887-1920 An Indian mathematician who discovered the formula for  $\pi$

Using circles to estimate areas of fields.

<http://www.agritechtalk.org/Uno%20How%20Visit%201%20part%201.html>

Use temperatures of the states of America in international folder.

The number of Significant figures used for different data changes depending on how accurate you need to be.

John Napier 1550-1617 standardised the use of the decimal point.

Thales c.636 – c.546BC A Greek philosopher found that angles at the base of an isosceles triangle are equal.

Euclid born 300BC A Greek mathematician who was the 'founder of geometry' proved the exterior angles theory.

Euclid born 300BC A Greek mathematician who was the 'founder of geometry' found an algorithm for finding HCF and LCM.

Use different units of measurements eg. km, miles as well as different SI units.

Where and why did metric come about?

The golden ratio <https://www.livescience.com/37704-phi-goldenratio.html>

Use literacy rates as percentages or any other international data.

Use international data.

Baye's theorem <https://www.mathsisfun.com/data/bayes-theorem.html>

Thomas Bayes 1702 – 1761 English Statistician.

Abraham de Moivre French mathematician 1667 – 1754 developed game theory and actuarial mathematics.