

# Mathematics Learning Journey

## GCSE Higher

Revision and Exam Papers

### Unit 19 Proportion and graph

- Proportion graphs
- Sketch exponential graphs
- Gradient of a tangent at a point
- Area under a graph – trapeziums etc
- Transforming graphs – function notation, translation
- Transforming graphs – function notation, stretch
- Transforming graphs – function notation, reflection

### Unit 18 Vectors

- Vector notation – calculate magnitude
- Vector arithmetic
- Vector problems – parallel lines
- Vector problems - collinear
- Vector problems - proof

### Unit 17 More algebra

- Equation of a tangent to a circle
- Rearranging formulae
- Algebraic fractions – add and subtract
- Algebraic fractions – multiply and divide
- Simplify algebraic fractions
- More complex algebraic fractions – add, subtract, times & divide
- Simplify surds
- Expand brackets with surds
- Rationalise the denominator
- Equations with algebraic fractions
- Functions
- Composite functions
- Inverse functions
- Proof - algebra
- Quadratic inequalities

### Unit 14 Further statistics

- Sampling incl stratified. Stem and leaf
- Cumulative frequency graphs
- Median/IQR Compare
- Boxplots
- Draw histograms
- Interpret histograms

### Unit 15 Equations and graphs

- Simultaneous equations – graphically
- Graphical inequalities – shading regions
- Draw quadratic functions
- Solve quadratic equations graphically
- Sketch cubic graphs
- Iteration – to solve quadratic and cubic equations

### Unit 16 Circle theorems

- Circle Theorems
- Circle Theorem proofs

### Unit 13 Trigonometry 2

- The Sine curve – solve equations from it
- The cosine curve – solve equations from it
- The tangent function – solve equations from it
- Sine rule for area of a triangle and segment of a circle
- The sine rule
- The cosine rule
- The sine and cosine rule
- 3D Pythagoras
- Transforming trig graphs

### Unit 12 Similarity and Congruence

- Conditions of congruence
- Proof - congruence
- Similar shapes
- Scale factor and area
- Scale factor and volume
- Upper and lower bounds

### Unit 11 Multiplicative reasoning

- Compound interest and depreciation
- Compound measures – speed and acceleration
- Convert between metric measures of speed
- Direct proportion
- Indirect proportion

### Unit 7 Area and Volume

- Area and perimeter of compound shapes
- Area of a trapezium
- Find min and max values of a measurement.
- Covert metric units of volume.
- Volume and surface area of prisms.
- Area and circumference of a circle
- Area and perimeter of semi and quarter circles
- Arc lengths and area of sectors
- Volume and surface area of a cylinder
- Volume and surface area of a sphere

### Unit 8 Transformations and constructions

- Reflection
- Rotation
- Enlargement fractional scale factor
- Enlargement negative scale factor
- Translation
- Bearings and map scales
- Perpendicular bisector
- Angle bisector

### Unit 9 Equations and inequalities

- Factorise quadratic expressions
- Solve quadratic equations
- Use the quadratic formula
- Use the quadratic formula
- Completing the square
- Simultaneous equations
- Simultaneous equations
- Simultaneous equations with a quadratic
- Solve inequalities

### Unit 10 Probability

- Product rule for number of outcomes.
- Sample space diagrams
- Mutually exclusive events
- Compare experimental and theoretical probabilities
- Tree diagrams
- Venn diagrams

### Unit 6 Graphs

- Gradient and intercept from an equation
- Sketch graphs using gradient and intercept
- Equation of a line given gradient and a point
- Gradient of a line given 2 points
- Distance – Time graphs and average speed
- Velocity – Time graphs and acceleration
- Direct proportion graphs
- Mid-point, length and gradient of a line segment
- Equations of parallel and perpendicular lines
- Draw quadratic graphs
- Solve equations using quadratic graphs. Identify symmetry.

### Unit 4 Fractions, ratio and percentage

- Add and subtract fractions
- Multiply and divide fractions
- All 4 operations with mixed fractions
- Ratio – Simplify and n:1 and 1:n
- Divide in a ratio and solve problems
- Currency conversions. Direct proportion (simple)
- Work out percentage increases and decreases. Multipliers.
- Real life problems with percentages

### Unit 2 Algebra

- Rules of indices
- Expand brackets
- Factorise expressions
- Solve equations with brackets and fractions
- Substitute into formulae
- Simple rearranging formulae
- Equations vs Formulae vs Identities
- Nth term of a sequence
- Geometric and Fibonacci sequences

### Unit 5 Angles and trigonometry

- Angles in triangles and quadrilaterals
- Angles in polygons – interior and exterior
- Pythagoras' theorem
- Trigonometry

### Unit 3 Interpreting and representing data

- Frequency polygons and pie charts
- Time series graphs
- Scatter graphs and LOBF
- Mean and other averages from a frequency table
- Estimated mean and averages from a grouped frequency table
- 2-way tables and frequency trees

### Unit 1 Number

- HCF and LCM
- Surds
- Fractional and negative indices
- Standard form
- Estimation

11

10