

Year 11 Maths Learning Outcomes

Unit 1: Investigating Properties of Shapes

- Solve 3D Pythagoras problems.
- Solve 3D trigonometry problems (SOHCAHTOA).
- Use and apply the Sine Rule.
- Use and apply the Cosine Rule.
- Use and apply $0.5ab\sin C$.

Extended learning:

- Solve problems involving Sine Rule/Cosine Rule with bearings.

Unit 2: Calculating

- Simplify surds.
- Add/subtract/multiply/divide surds.
- Expand brackets with surds.
- Rationalise the denominator.

Extended learning:

- Problem solving involving surds e.g. Pythagoras involving surds.

Unit 3: Solving Equations and Inequalities

- Complete the square for a given quadratic expression.
- Identify turning points using completed the square form.
- Solve quadratics using quadratic formulae.
- Solve iteration problems.

Extended learning:

- Links made to completing the square and transformation of quadratics.
- Proof of the quadratic formula using completing the square.

Unit 4: Mathematical Movement

- Enlargement with a negative scale factor (including negative fractions).
- Combinations of transformations (translations/reflections/enlargements/rotations).

Unit 5: Algebraic Proficiency

- Use function notation for finding the value of a function.
- Derive composite functions.

- Find the inverse for a given function.

Extended learning:

- Links to function notation for transformations of graphs.

Unit 6: Mathematical Movement

- Algebraic proof.
- Counter proof.
- Geometric proof (Congruent triangles/Circle theorems).
- Recurring decimal proof.

Unit 7: Pattern Sniffing

- Nth term linear sequences (patterns).
- Nth term quadratic sequences.
- Fibonacci style sequences.
- Arithmetic/Geometric sequences.

Unit 8: Solving Equations and Inequalities 2

- Solving quadratics.
- Turning points/roots and intercepts of quadratics.
- Solve quadratic inequalities.
- Solve Linear and Non-linear pair of simultaneous equations.
- Solve Linear and Non-linear pair of simultaneous equations graphically.

Extended learning:

- Solve simultaneous equations involving only circles and quadratics.

Unit 9: Algebraic Proficiency (Visualising)

- Plot graphs for trigonometric functions.
- Find angles of any size using trigonometric graphs.
- Know the effects on the original graph by transforming the graph with $y = f(x)$: $f(x) + a$, $f(x + a)$, $y = f(-x)$ and $y = -f(x)$
- Know the effects on a coordinate by transforming the graph with $y = f(x)$: $f(x) + a$, $f(x + a)$, $y = f(-x)$ and $y = -f(x)$
- Apply transformation of graphs on trigonometric graphs.

Extended learning:

- Combinations of transformations e.g. reflection then a translation.

Unit 10: Analysing Statistics

- Construct histograms.
- Interpret histograms.
- Solve problems involving histograms.

Extended learning:

- Comparing two histograms.
- Converting histograms into other forms of data representation e.g. pie charts, grouped frequency tables.

Unit 11: Algebraic Proficiency (Visualising) 2

- Complete the square for a quadratic function.
- Deduce the turning point of a quadratic function by completing the square.
- Deduce the roots of a quadratic function by factorising.
- Discriminant of a quadratic.
- Deduce the roots of a quadratic function using the completed square form.
- Gradient of a tangent to a curve at a given point.
- Area under a curve.

Unit 12: Mathematical Movement (Vectors)

- Prove two vectors are parallel.
- Show that two vectors make a straight line.
- Make deductions about situations involving vectors expressed using ratios.