KS4 Maths –Mapping Overview

Triangle Pathway

A student following a triangle pathway will study these curriculum goals throughout Y10 & 11.

These are extracts from the Scheme of Work and show the key content that is taught in each unit.
Each unit of study is not limited to these curriculum goals.

Students are able to 'change lanes' onto a different pathway if they require a different speed & challenge.

REDHILL ACADEMY TRUST

N1

Estimate or check the result of a calculation by rounding to one significant figure.

Apply the priority of operation to calculations.

N2

Write a number as a product of its prime factors, giving the answer in index notation.

Convert large and small numbers to and from standard form.

GM1

Given geometrical reasons to justify properties of 2D shapes.

Calculate interior and exterior angles of polygons.
Know and use the properties of angles with parallel lines.

A1

Rearrange formula to change the subject.

Form expressions & formulae from real world contexts.

Expand and simplify single brackets.
Factorise expression by taking out common factors.

N3

Add, subtract, multiply & divide mixed numbers.

Convert between FDP.

A2

Represent and read inequalities on a number line

Solve equations with unknowns on both sides.

N4

Calculate percentage increase, decrease and percentage change using decimal multipliers.

Write ratios in the form 1:n

Solve ratio problems.

Solve currency conversion problems.

GM2

Solve problems involving perimeter & area of 2D shapes, including circles & composite shapes.

Use Pythagoras' Theorem to find the length of a hypotenuse.

S1

Understand the difference between a population & a sample.

Know different sampling methods.

Recognise graphical misrepresentation through incorrect scales & labels.

S2

Plot and interpret scatter diagrams and draw a line of best fit.
Use correlation to describe data & identify outliers.

GM3

Find missing lengths of cubes & cuboids when given volume.

Calculate volume of cylinders.
Interpret & construct plans & elevations.

A3

Recognise Fibonacci sequences.

Understand that parallel lines have the same gradients and state gradients of parallel lines.

Recognise & sketch graphs of simple quadratic functions.

GM4

Perform transformations; translations, rotations using a centre of rotation, reflections in a given line, including y=x and y=-x.

Enlarge a shape given a centre of enlargement. Identify the scale factors of a given enlargement.

S3

Use probabilities to calculate outcomes in repeated experiments.

Use a Venn diagram to organise data and calculate probabilities.

Use sample space diagrams to record and calculate probabilities of combined events.

GM5

Use and convert between metric units.

Know approximate metric and imperial conversions.

Know and apply Speed = Distance ÷ Time

Use a protractor to measure and draw bearings.

KS4 Maths –Mapping Overview

Square Pathway

A student following a square pathway will study these curriculum goals throughout Y10 & 11.

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REDHILL ACADEMY TRUST

N1

Estimate, without a calculator, complex calculations including powers and decimals.

N2

Use prime factors to find HCF & LCM and express answers using correct power notation. Know and apply the laws of indices. Multiply & divide with numbers in standard form.

GM1

Solve problems to find missing angles or the number of sides with regular polygons.

Know and use angle facts on parallel lines.

A1

Simplify basic algebraic products & quotients.

Rearrange formula to change the subject, including those with fractions or powers.

Use and apply kinematics formulae.

Expand and simplify double brackets.

N3

Solve worded problems that rely on the use of calculating with mixed numbers.

Convert between FDP.

A2

Set up and solve linear equations for real world problems. Solve inequalities and represent solutions on a number line.

Solve simultaneous equations algebraically.

N4

Calculate reverse percentages.

Calculate both simple and compound interest.

Solve ratio problems.

Solve simple worded problems involving quantities in both direct & indirect proportion.

GM2

Solve problems involving perimeter & area of 2D shapes, including composite shapes & those expressed algebraically.

Calculate exactly with multiples of pi.

Use Pythagoras' Theorem to solve problems in 2D.

S1

Find the modal class and calculate estimates of mean, median & range from a frequency table.

Understand what is meant by simple random sampling & bias in sampling.

Interpret & construct stem & leaf diagrams and compare the distributions of discrete data sets.

S2

Plot & interpret scatter diagrams. Identify outliers & the relationship between represented data.

Calculate moving averages.

Identify trends.

GM3

Find the missing height, radius or diameter of a cylinder given the volume.

Find the volume & surface area of pyramids, cones & spheres.

Use and compare standard units of measurement for volume and capacity.

A3

Find the nth term of an arithmetic sequence. Recognise simple geometric progressions.

Use the form y=mx+c to plot straight line graphs and state gradients & y-intercepts.

Calculate the gradient of a line segment.

Use a table of values to plot quadratic graphs.

GM4

Perform and describe transformations.

Identify scale factors in similar shapes and find missing lengths.

Understand and use scalar multiplication of vectors.

S3

Use relative frequency as an estimate of probability.

Use tree diagrams to record probabilities of successive events.

GM5

Know and apply Density = Mass ÷ Volume

Use a compass to construct perpendicular bisectors, angle bisectors & the locus of points.

KS4 Maths –Mapping Overview

Pentagon Pathway

A student following a pentagon pathway will study these curriculum goals throughout Y10 & 11.

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REDHILL ACADEMY TRUST

Content highlighted is that which is taugtht to those students hoping to progress onto the higher tier GCSE.

N1

Estimate, without a calculator, complex calculations including powers and decimals.

Find upper & lower bounds of previously rounded numbers.

N2

Know and apply the laws of indices with coefficients.

Perform the four operations with numbers in standard form.

GM1

Use the formal proofs to prove two triangles are congruent.

Know and use angles facts on parallel lines.

Find unknown angles through algebraic methods.

A1

Expand single brackets and factorise expressions.

Change the subject of a given formula that include powers or fractions.

Expand, factorise & solve quadratics.

N3

Solve worded problems that rely on the use of calculating with mixed numbers.

Convert between recurring decimals & fractions.

S2

Plot & interpret scatter diagrams.

Identify outliers & the relationship between represented data.

S1

Understand the terms: population, sample, random sampling and bias sampling.

Find missing values in a data set when averages are given.

Recognise graphical misrepresentations.

GM2

Solve problems involving perimeter & area of 2D shapes, including composite shapes & those expressed algebraically.

Find arc length & sector area.

Use & apply Pythagoras' Theorem & Trigonometry in right angle triangles.

N4

Calculate reverse percentages.

Calculate both simple & compound interests, including in financial contexts.

Solve ratio problems.

Solve direct & inverse proportion problems.

A2

Set up and solve linear equations for perimeter & angle problems.

Solve inequalities and represent solutions on a number line.

Solve simultaneous equations algebraically and graphically.

GM3

Recognise & know the properties of the cylinder, pyramid, cone & sphere.

State the 3D co-ordinates of solids represented on axes.

Calculate the surface area of a cylinder.

A3

Calculate the length of a line segment using Pythagoras.

Use the form y=mx+c to plot straight line graphs and find equations of lines that are parallel to one another.

Recognise & plot quadratic graphs. Use the roots and symmetry to find the turning point.

GM4

Perform & describe a sequence of transformations.

Understand and use scalar multiplication of vectors.

Find missing sides in similar shapes.

Enlarge shapes using fractional scale factors.

S3

Use relative frequency as an estimate of probability.

Construct tree diagrams & Venn diagrams and calculate probabilities.

GM5

Use a compass to construct perpendicular bisectors, angle bisectors & the locus of points.

Use distance time graphs to solve problems.

Calculate bearings on diagrams using angle facts & draw diagrams to scale using bearings.

KS4 Maths –Mapping Overview

Heptagon Pathway

A student following a heptagon pathway will study these curriculum goals throughout Y10 & 11.

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REDHILL ACADEMY TRUST

N1

Use inequality notation to write error intervals for numbers measured to an appropriate degree of accuracy.

Apply & interpret limits of accuracy to solve problems

N2

Calculate with negative & fractional indices.

Perform calculations with surds, including adding, multiplying, expanding brackets & rationalising the denominator.

Work out percentage calculations involving standard form.

GM1

Use the formal proofs to prove two triangles are congruent.

Find missing angles or number of sides in regular & irregular polygons.

Know & apply circle theorems to find missing angles.

A1

Simplify algebraic fractions.

Change the subject of a given formula, including where the subject appears twice.

Expand triple brackets.

Know & use the quadratic formula.

Calculate with the Kinematics formulas.

N3

Solve worded problems that rely on the use of calculating with mixed numbers.

Convert between recurring decimals & fractions.

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S2

Plot & interpret scatter diagrams.

Identify outliers & the relationship between represented data.

Calculate moving averages.

S1

Find missing values in a data set when averages are given.

Draw & interpret box plots and cumulative frequency.

Compare data sets using median & interquartile range.

Construct & interpret Histograms.

GM2

Find arc length & sector area.

Use & apply Pythagoras' Theorem & Trigonometry in right angle triangles, both in 2D & 3D.

Know exact values of sinΘ, cosΘ & tanΘ.

Know & apply the formulas for area of any triangle, sine rule & cosine rule.

N4

Calculate percentage problems, including non-routine problems and those in financial contexts.

Express exponential growth or decay as a formula and solve problems.

Solve ratio problems.

Solve direct & inverse proportion problems, including those with powers & roots.

A2

Solve linear equations which include the manipulation of algebraic fractions.

Solve simultaneous equations algebraically and graphically.

Find the intervals in which a solution lies using a sign change method.

Use iteration to find approximate solutions.

GM3

State the 3D co-ordinates of solids represented on axes.

Solve problems involving the volume or surface area of pyramids, cones & spheres.

Write expressions for the volume or surface area of cones & spheres.

Use algebra to solve percentage problems involving the volume of solids.

A3

Find the nth term of a quadratic sequence.

Find equations of lines that are parallel & perpendicular to one another.

Plot quadratic graphs & identify the intercepts & turning points.

Find inverse functions & composite functions.

Recognise & sketch the graphs of y=sinΘ, y=cosΘ & y=tanΘ

GM4

Perform & describe a sequence of transformations.

Use & calculate with vectors in geometric diagrams & proofs.

Understand and use the relationships between lengths, areas & volumes in similar shapes.

Enlarge shapes using fractional & negative scale factors.

S3

Construct tree diagrams & Venn diagrams and calculate probabilities.

Calculate conditional probabilities.

GM5

Use a compass to construct perpendicular bisectors, angle bisectors & the locus of points.

Solve complex problems involving density, mass, volume.

Solve bearing problems that involve sketching right angled triangles and using Pythagoras' Theorem or Trigonometry.