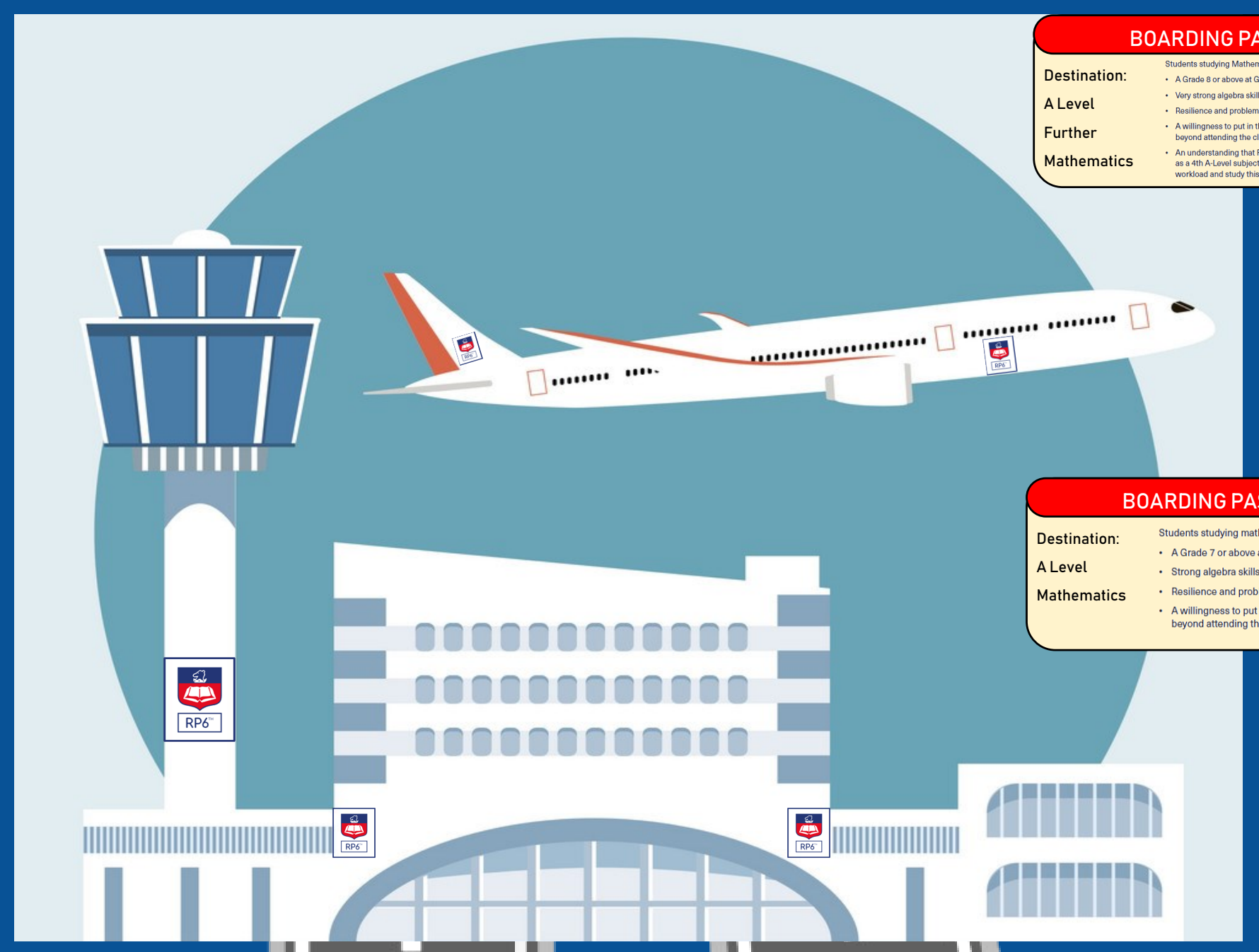
MATHEMATICS CURRICULUM JOURNEY



BOARDING PASS

Destination:
A Level
Further
Mathematics

Students studying Mathematics will need:

- A Grade 8 or above at GCSE Mathematics.
- Very strong algebra skills from GCSE study.
- Resilience and problem solving skills.
- A willingness to put in the required study time beyond attending the classroom lessons.
- An understanding that Further Mathematics is taken as a 4th A-Level subject and the increase demand on workload and study this requires from you.

BOARDING PASS

Destination:
A Level
Mathematics

Students studying mathematics will need:

- A Grade 7 or above at GCSE Mathematics.
- Strong algebra skills from GCSE study.
- Resilience and problem-solving skills.
- A willingness to put in the required study time beyond attending the classroom lessons.

Pure: Number
Locating roots, iterative formulae, trapezium rule, Newton-Raphson formulae.

Pure: Algebra
Proof by contradiction, partial fractions, differentiating using chain rule, product rule, quotient rule, integration by parts, integration by substitution.

Pure: Geometry
Radian measure, trigonometric identities, trigonometric equations, 3D vectors, vector proof.

Statistics
Representing data, statistical measures including quartiles, percentiles and standard deviation, binomial distribution, hypothesis testing.

Mechanics
Newtonian mechanics with inclined planes and connected particles. Mo- friction,

Core pure 2
Demoivre's theorem, Maclaurin series, methods in calculus, Polar coordinates, Hyperbolic functions, solving first and second order differential equations.

Discrete
Algorithms, graphs and networks, minimum spanning trees, Dijkstra's and Floyd's algorithms. Route inspection, critical path analysis. Linear programming,simplex method.

Pure: Number
Surds, rationalising and contextual problems, exponential functions and logarithms.

Pure: Algebra
Quadratic functions, algebraic long division, binomial expansion, differentiation of polynomials, integration.

Pure: Geometry
Equations of lines in context, equations of circles, trigonometric equations and identities, vectors and **i**, **j** notation.

Statistics
Conditional probability, regression, non linear regression and hypothesis testing, normal distribution.

Mechanics
Kinematics and SUVAT formulae, dynamics and statics using newtons laws, variable acceleration.

Core pure 1
Complex numbers, argand diagrams, roots of polynomials, volumes of revolution, matrices, proof by induction, vector equations.

Further Mechanics
Momentum and impulse, work, energy, power, elastic strings and springs, elastic collisions in one or two dimensions.

GCSE

Higher tier 4-9

Foundation Tier 1-5

✈

Post 16 Destina-

Probability
Set notation, Venn diagrams. Conditional probability in context.

Algebra
Graphing inequalities, defining regions.

Algebra
Algebraic skills with surds, working with algebraic fractions, rearranging formulae.

Geometry
Trigonometry on non-right angle triangles. Sine rule and Cosine rule.

Geometry
Transformations- Rotations, reflection, enlargement, translation and successive transformations.

Geometry
Volumes and surface area of prisms, cones, spheres, making use of 3D Pythagoras' theorem.

Statistics
Histograms and harder cumulative frequency problems.

Statistics
Cumulative frequency graphs and box plots. Comparing and contrasting sets of data.

Number
Working with negative and fractional powers. Introducing surds. $\sqrt{a}\times\sqrt{b}=\sqrt{ab}$

Algebra
The equation of a circle, solving quadratic equations by completing the square or the quadratic formula.

Geometry
Circle theorems, alternate segment theorem.

Statistics
Histograms and harder cumulative frequency problems.

Number
Operations with surds- rationalising where there are more than one term in the denominator.

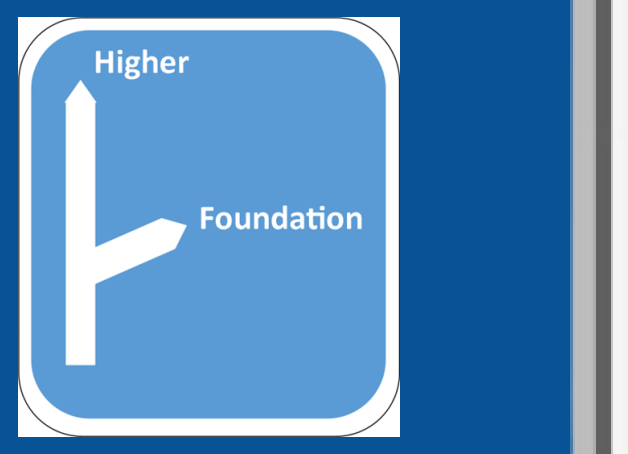
Number
Working with recurring decimals.

Algebra
Algebraic skills with surds, working with algebraic fractions, rearranging formulae.

Number
Direct proportion, inverse proportion, compound measures.

Algebra
Simultaneous equations using substitution. Solving equations using iterative formulae.

Geometry
Trigonometry- finding missing values in right angle triangles.



Geometry
Trigonometry- finding missing values in right angle triangles.

Geometry
Transformations- Rotations, reflection, enlargement, translation and successive transformations.

Geometry
Pythagoras' theorem, volumes and surface area of prisms.

Algebra
Investigating linear sequences, finding the nth term, finding values in a sequence.

Geometry
Angles in polygons, parallel lines and properties of 2D shapes.

Ratio
Sharing in a ratio given the whole amount, a value of one part or the difference between two parts.

Geometry
Loci and constructions, regions that satisfy multiple loci.

Number
Rounding, estimation, bound calculations and error intervals

Algebra
Solving Simultaneous equations graphically and algebraically.

Ratio
Direct proportion, inverse proportion, compound measures.

Algebra
Plotting and using non-linear graphs to solve problems.

Algebra
Finding the equation of a line, calculating gradient, calculating midpoints of line segments.

Algebra
Solving linear equations and inequalities in contextual problems.

Number
Percentage calculations and problems, simple vs. compound interest problems, calculating the original amount.

Number
Prime factor decomposition, highest common factor and lowest common multiple.

Probability
Theoretical probability, relative frequency, frequency trees, sample space diagrams.

Number
Laws of indices, operations in standard form, problems in context.

Year 9 Avenue

Statistics
Averages and range from grouped frequency tables, comparing data sets.

Geometry
Loci and constructions: angle bisector, perpendicular bisector.

Algebra
Solving and representing inequalities.
Solve $14 < 3x + 2 \leq 26$

Geometry
Area of sectors, lengths of arcs, Pythagoras' theorem.
Volumes of prisms.

Probability
Tree diagrams for independent events and conditional probability.

Statistics
Scatter diagrams, histograms
Desribe the correlation of ...

Number
Laws of indices, standard form, error intervals and bound calculations.
$(3\times10^{7})\times(6\times10^{9})$

Algebra
Expanding two binomials, factorising binomials.
Factorise $x^2+7x-18$

Ratio
Direct and inverse proportion. Graphing and compound measure.

Algebra
Solving Simultaneous equations graphically and algebraically.

Year 8 Road

Geometry
Area of a circle, volume of a prism.
Calculate the area of a circle with diameter of 12 cm

Ratio
Using direct proportion, best buys, compound measure.
Calculate the speed then a car travels 82 miles

Algebra
Expanding brackets, factorising, indices, substitution.

Probability
Probability scale, two way tables, sample space diagrams, relative frequency.

Number
Prime factor decomposition, highest common factor
Express 256 as a product

Statistics
Presenting Data- bar charts, pie charts, comparing data
Construct a pie chart to

Number
Percentage increase/ decrease, simple interest, calculating the original amount.
Increase £43 by 7%

Geometry
Angles in parallel lines, exterior and interior angles.
What is the sum of the interior angles of a

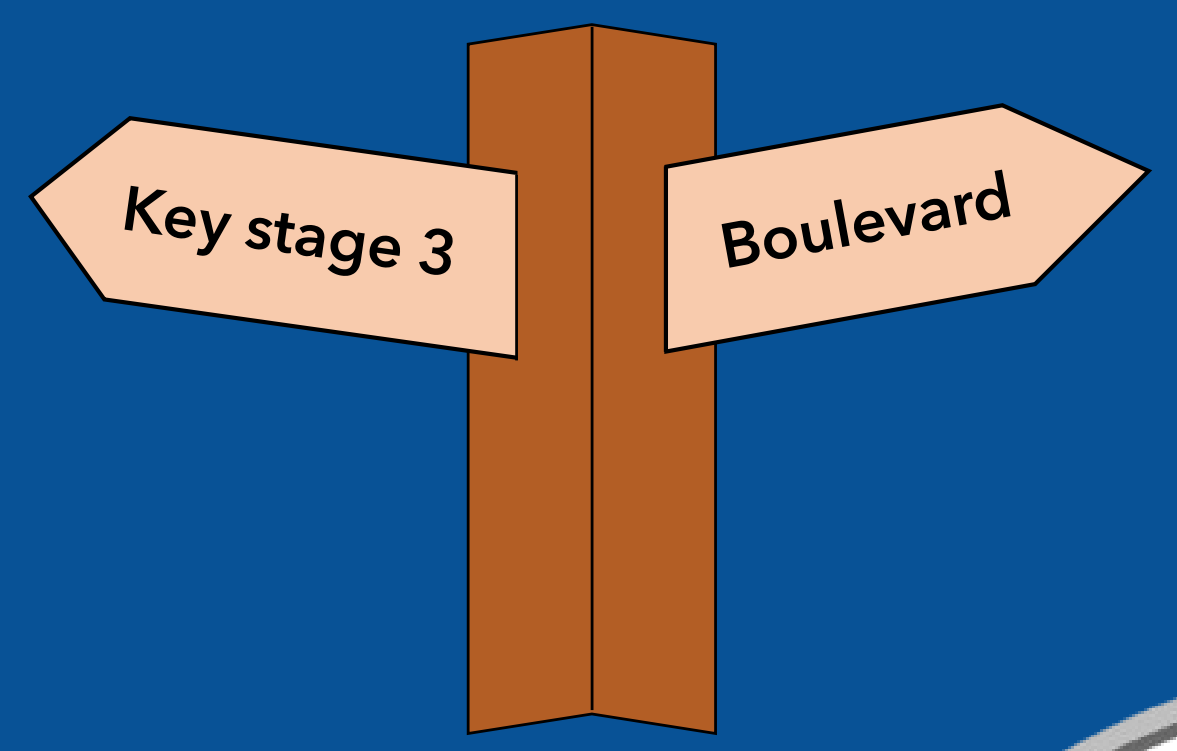
Algebra
Sequences, calculating the nth term
Find the formula for the nth *term*

Probability
Frequency trees, Venn diagrams, relative frequency.

Geometry
Plans, elevations, Bearings
If the bearing of B from A is 035, what is the bearing of A from B?

Statistics
Averages and range from lists.
Calculate the mean of

Year 7 Street



Number
Factors, Multiples, Primes.
Primes: 2, 3, 5, 7 ...

Algebra
Simplifying, expanding brackets
Expand $3x(2x-7)$

Algebra
Solving equations
Solve $3x+2=11$

Geometry
Area and Perimeter.
What is the side length of a

Number
Calculations with Negative numbers
$(3-7)\times(-4)$

Number
Calculations with fractions
$3\frac{2}{5}+2\frac{1}{7}$

Ratio
Simplifying, sharing
Share £24 in the ratio 5: 3

Geometry
Properties of shapes, angle rules on lines.
What makes a shape a Rhombus?