



THOMAS ALLEYNE'S HIGH SCHOOL

Maths (Higher):

LEARNING JOURNEY

6TH FORM

POST-16 PATHWAY

College/Apprenticeships

Final Exams

Revision and Past Paper Practice

Non-linear graphs Transforming functions Pre-calculus

Vectors Simultaneous equations Algebraic fractions

Trigonometry Inequalities Circle theorems

Mock Exam

Growth & decay, Equations Direct & inverse proportion Functions

Algebra review Graphs Volume & surface area

Year 11

Probability Statistics review Quadratics

Congruence & similarity Pythagoras & trigonometry Number review

Standard form Polygons Simultaneous equations

Percentages Surds Constructions & loci

Equations Scatter graphs 2D rep of 3D shapes

Introduction to Quadratics

Year 10

Indices, Measures Transformations Statistical measures

Circles Ratio Probability

Percentages Linear & real-life graphs

Rounding & estimation Sequences Perimeter & area

Basic algebra Fractions Data

Basic Number Angles Scale drawings

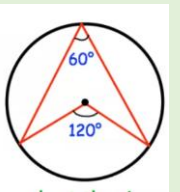
Year 9

Y8 Taster Sessions / Transition days

In the summer term students take their GCSE exams. For maths this will involve three 80-mark papers: one non-calculator and two calculator papers.
Any topic can be on any paper.

In the final term of Y11 we use students previous assessments to revisit areas of weakness for revision and use past paper questions to practice and prepare students for the upcoming GCSE exams.

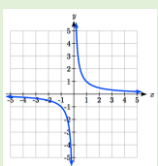
Students will recap the previous work on graphs then extend this into the equation of a circle and finding tangents to a circle. They will sketch and describe transformations of functions. They will find the gradient of a tangent to a curve and interpret this value. Students will use their knowledge of area of 2D shapes to approximate the area under a curve and interpret this value.



CEIAG 6th Form interviews take place Jan of Y11

Student will revisit trigonometry, consolidating the work from Y10 and learning the sine and cosine rules. Students will solve linear and quadratic inequalities. They will be represented graphically and using set notation. Students will learn and apply the circle theorems and their proofs.

Students will build on the work from Y9 probability to learn about tree diagrams with independent and dependent events, and Venn diagrams including set notation. Statistical graphs will be reviewed (scatter, cumulative frequency, box plots and histograms). Work on quadratics from Y9 will be recapped and extended to include expressions with $a > 1$ and completing the square.

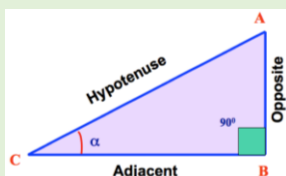


The work on sequences, rearranging formulae and linear equations will be reviewed. The Y9 work on graphs will be recapped, with further work on parallel and perpendicular lines and extending onto finding the equation of a line through 2 points. Students will study quadratic, cubic, reciprocal and exponential graphs and solving non-linear equations graphically. They will extend the previous work on 3D shapes to calculating the volume of prisms, pyramids, cones and spheres and recapping the surface area of these shapes

Students will build on the previous work on simultaneous equation, extending it to include quadratic equations. Vectors will be introduced – students will add, subtract and multiply by a scalar. They will determine if vectors are parallel or collinear. Students will simplify and use the four operations with algebraic fractions before solving equations that contain algebraic fractions.

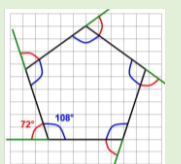
Students will start Y11 by broadening their knowledge of percentages into compound growth and decay. Solving quadratics will be reviewed and extended into setting up and solving equations as well as using iteration. They will construct and solve equations to represent direct and inverse proportion problems and sketch their graphs. Function notation will be introduced and used to find compound and inverse functions.

$$\begin{aligned} 3x - 6y &= 24 \\ 2x + y &= 1 \end{aligned}$$



Students will build on the work on indices to convert to and from standard form, and then calculate with numbers in standard form. The previous work on angles is broadened to include angles in regular and irregular polygons. Simultaneous equations are introduced and solved by elimination and graphically.

Students will learn about congruent triangles (ASA, SAS, SSS, RHS) and will calculate missing values in similar shapes (incl area and volume). Pythagoras' theorem is recapped and students are introduced to trigonometry. They will learn how to use sin, cos and tan to find the missing angle or side in a right-angle triangle. They will learn and use the exact trig values. The work on bounds, recurring decimals and product rule for counting will be reviewed and extended.



Students will learn the different part of a circle and calculate the circumference and area of circles and part circles (arc length and area of sectors). This will be extended to calculate the surface area of spheres, cones and pyramids. Students will change between ratio and fractions before simplifying and dividing with ratio. They will look at multiplicative relationships and best buys. In the probability unit students will list outcomes, calculate probabilities and draw and interpret two-way tables and frequency trees.

Students will substitute values into expressions and formulae and solve linear equations. They will extend the previous work on graphs into scatter graphs – plotting and interpreting, drawing lines of best fit, correlation and identifying outliers. Students will recap the names, properties and nets of 3D shapes before extending this to drawing plans and elevations and isometric drawings.

Students will recap the percentages work from Y9 and extend it into calculating repeated change and reverse percentages. Surds will be introduced with students simplifying surds, calculating with surds and rationalising the denominator. Students will review how to accurately construct triangles before moving onto constructing a perpendicular bisector and an angle bisector as well as solving loci problems



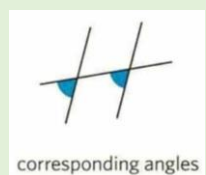
$$\begin{aligned} a^n \times a^m &= a^{n+m} \\ (a^n)^m &= a^{n \times m} \\ a^m \div a^n &= a^{m-n} \\ a^0 &= 1 \\ a^{-1} &= \frac{1}{a} \text{ and } a^{-n} = \frac{1}{a^n} \\ a^{1/2} &= \sqrt{a} \text{ and } a^{1/3} = \sqrt[3]{a} \\ a^m &= (a^{1/m})^m = (\sqrt[m]{a})^m \end{aligned}$$

Students will calculate percentages of amounts, percentage change and increase / decrease by a percentage. They will be able to convert between fractions, decimals and percentages. Students will review plotting and reading coordinates before plotting straight line graphs. The gradient and intercept will be used to find the equation of a straight line, parallel and perpendicular lines will be studied. Students will draw and interpret conversion graphs, distance-time graphs and speed-time graphs

Students will expand 2 and 3 brackets, factorise into 2 brackets and the difference of two squares. They will learn how to solve quadratics by factorising and using the formula

$$\begin{aligned} \text{If: } & ax^2 + bx + c = 0 \\ \text{Then: } & x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \end{aligned}$$

Students will start Y10 evaluating indices and using the rules of indices, including fractional and negative indices. Students will learn about compound measures (speed, density and pressure), convert between units of measurement and calculate with upper and lower bounds. Students review and broaden work on reflections, rotations, translations and enlargement. Students will recap mean, median, mode and range and extend this into grouped and ungrouped frequency tables..



Students will learn how to round to decimal places as well as significant figures, estimate calculations and calculate with upper and lower bounds. Student will find the nth term of both linear & quadratic sequences. They will learn about special sequences of numbers including triangle, square, cube, geometric, quadratic and Fibonacci sequences. Students will find the perimeter of shapes, the area of triangles, quadrilaterals and compound shapes. This will be extended to calculate the surface area of cuboids and prisms.

Students will ensure they understand algebra notation and use it to write and simplify expressions, they will work with single brackets. In the fractions unit students will order fractions and use the 4 operations. Students will know the different types of data and how they can collect data. They will represent the data through histograms, cumulative frequency graphs and box plots.

Students will begin their journey in mathematics by ensuring their basic number skills are good – 4 operations, negative numbers, decimals, factors, multiples and prime numbers. They will change recurring decimals into fractions. They will recap the angle facts and rules and then extend these into angles on parallel line and bearings. They will also interpret and draw scale drawings..

WELCOME