Mathematics	Working towards expected outcomes Your child is not yet making the expected progress within this course.	Working at expected outcomes Your child is achieving the expected progress for this point within the course.	Working beyond expected outcomes Your child is exceeding the expected progress.
Autumn Term	Students working **towards** expected outcomes in Y13 can: • Use and recall sine, cosine and tangent ratios; understand sec θ, cosec θ and cot θ as reciprocals and sketch their basic graphs. • Apply basic trig identity sin^2 θ + cos^2 θ = 1 to simplify simple expressions and solve straightforward equations. • Differentiate power functions x^n, sin x and e^x and in simple cases use the product, quotient and chain rules to find gradients at given points. • Plot simple parametric curves by substituting values of t; identify the corresponding (x, y) points.	Students working **at** expected in Y13 can: • Use addition and double-angle formulae sin(A+B), sin(A–B), cos(A+B), cos(A–B), tan(A+B), tan(A–B), cos 2A and sin 2A to solve trig equations in radians or degrees. • Express a cos θ + b sin θ in the form R cos(θ – α) and solve for θ over specified intervals. • Understand domains, ranges and graphs of arcsin, arccos and arctan. • Apply product, quotient and chain rules to differentiate combinations of polynomials, exponentials, logarithms and trig functions; find equations of tangents and normals. • Convert simple parametric forms to Cartesian equations (e.g. x = 3 cos t, y = 3 sin t) and sketch the resulting curves.	Students working **beyond** expected in Y13 can: **In addition to the skills listed under 'Working At' for this topic, students working beyond expected outcomes can:** • Prove compound-angle and reciprocal-function identities (e.g. sec^2 θ = 1 + tan^2 θ) by geometric or algebraic methods. • Investigate how harmonic form is used in a Physics context • Derive key derivatives from first principles (e.g. d/dx sin x = cos x, d/dx e^x = e^x). • Solve complex problems involving parametric equations

Spring Term	• Perform implicit differentiation on simple relations like x^2 + y^2 = 1 to find dy/dx. • Students working **towards** expected outcomes in Y13 can: • Factorise quadratics and perform basic algebraic (polynomial) division; simplify simple algebraic fractions. • Integrate x^n, sin k x, cos k x and e^(k x) by inspection, including constant of integration. • Sketch quadratics, cubics, exponentials and reciprocal graphs; identify key features (intercepts, asymptotes). • Locate roots of f(x) = 0 by sign-change on intervals; carry out simple fixed-point iteration. • Add and scale 2D vectors in component form; calculate	• Solve related-rates problems linking dy/dx and dx/dt. • Students working **at** expected in Y13 can: • Decompose rational functions into partial fractions (distinct and repeated linear factors). • Apply substitution and integration by parts to more complex integrals; use the trapezium rule for approximations. • Solve first-order separable differential equations with given initial conditions. • Work with modulus functions y = |f(x)|; sketch and solve related equations or inequalities. • Perform Newton–Raphson iterations; sketch cobweb diagrams and discuss convergence. • Extend vector methods to 3D (i, j, k); calculate distances, prove	Students working **beyond** expected in Y13 can: • Factorise higher-degree polynomials (degree ≥ 3) using algebraic division and identify real roots; use the factor theorem systematically. • Tackle complex integrals using a variety of methods with confidence • Solve differential equations that need rearranging into separable form with partial fractions; interpret solutions graphically. • Analyse and sketch modulus transformations with compound functions (e.g. y = |f(g(x))|) • Use vector proofs to establish general results

	magnitudes and draw vector diagrams. • Expand (1 + x)^n for small integer n	parallelism and solve simple plane/line problems. • Expand (1 + x)^n for rational n; find the general term and use the series for approximations	