



Year 12 Pure Maths Learning Journey

Curriculum Journey – Y12 Pure Mathematics

When?	Chapter	Key Learning Objectives Key Questions	Unit Assessment
HALF TERM 1	1. Algebraic expressions	Multiply and divide integer powers <ul style="list-style-type: none"> Expand a single term over brackets and collect like terms Expand the product of two or three expressions Factorise linear, quadratic and simple cubic expressions Know and use the laws of indices Simplify and use the rules of surds Rationalise denominators 	EOC 1 Test covering <ul style="list-style-type: none"> Expand brackets (single, double, triple) Collect like terms Factorise linear, quadratic and simple cubic expressions Laws of indices Rules of surds rationalise
	2. Quadratics	<ul style="list-style-type: none"> Solve quadratic equations using factorisation, the quadratic formula and completing the square Read and use $f(x)$ notation when working with functions Sketch the graph and find the turning point of a quadratic function Find and interpret the discriminant of a quadratic expression Use and apply models that involve quadratic functions 	EOC 2 Test covering <ul style="list-style-type: none"> solve quadratics factorise complete the square quadratic formula curve sketching turning point discriminant modelling quadratics
	3. Equations and inequalities	<ul style="list-style-type: none"> Solve linear simultaneous equations using elimination or substitution Solve simultaneous equations: one linear and one quadratic Interpret algebraic solutions of equations graphically Solve linear inequalities Solve quadratic inequalities Interpret inequalities graphically 	EOC 3 Test covering <ul style="list-style-type: none"> simultaneous equations, linear and quadratics inequalities, linear and quadratics

When?	Chapter	Key Learning Objectives Key Questions	Unit Assessment
		<ul style="list-style-type: none"> ● Represent linear and quadratic inequalities graphically 	
HALF TERM 2	4. Graphs and transformations	<ul style="list-style-type: none"> ● Sketch cubic graphs ● Sketch quartic graphs ● Sketch reciprocal graphs of the form $y = x^a$ and $y = ax^2$ ● Use intersection points of graphs to solve equations ● Translate graphs ● Stretch graphs ● Transform graphs of unfamiliar functions 	EOC 4 Test covering <ul style="list-style-type: none"> ● sketch cubic, quartic, reciprocal ● solve equations ● translate, stretch, transform graphs
	5. Straight line graphs	<ul style="list-style-type: none"> ● Calculate the gradient of a line joining a pair of points ● Understand the link between the equation of a line, and its gradient and intercept ● Find the equation of a line given (i) the gradient and one point on the line or (ii) two points on the line ● Find the point of intersection for a pair of straight lines ● Know and use the rules for parallel and perpendicular gradients ● Solve length and area problems on coordinate grids ● Use straight line graphs to construct mathematical models 	EOC 5 Test covering <ul style="list-style-type: none"> ● gradient ● $y = mx + c$ ● points of intersection ● parallel and perpendicular gradients ● length and area problems ● modelling
	6. Circles	<ul style="list-style-type: none"> ● Find the midpoint of a line segment ● Find the equation of the perpendicular bisector to a line segment ● Know how to find the equation of a circle ● Solve geometric problems involving straight lines and circles ● Use circle properties to solve problems on coordinate grids ● Find the angle in a semicircle and solve other problems involving circles and triangles 	EOC 6 Test covering <ul style="list-style-type: none"> ● midpoint ● perpendicular bisector ● equation of a circle ● straight lines and circles ● circle properties ● angle in a semicircle

When?	Chapter	Key Learning Objectives Key Questions	Unit Assessment
HALF TERM 3	7. Algebraic methods	<ul style="list-style-type: none"> ● Cancel factors in algebraic fractions ● Divide a polynomial by a linear expression ● Use the factor theorem to factorise a cubic expression ● Construct mathematical proofs using algebra ● Use proof by exhaustion and disproof by counter-example 	EOC 7 Test covering <ul style="list-style-type: none"> ● algebraic fractions ● algebraic long division ● algebraic proof ● proof by exhaustion and disproof by counter-example
	8. The binomial expansion	<ul style="list-style-type: none"> ● Use Pascal's triangle to identify binomial coefficients and use them to expand simple binomial expressions ● Use combinations and factorial notation ● Use the binomial expansion to expand brackets ● Find individual coefficients in a binomial expansion ● Make approximations using the binomial expansion 	EOC 8 Test covering <ul style="list-style-type: none"> ● Pascal's triangle ● combinations and factorial notation ● binomial expansion ● approximations using the binomial expansion
	9. Trigonometric ratios	<ul style="list-style-type: none"> ● Use the cosine rule to find a missing side or angle ● Use the sine rule to find a missing side or angle ● Find the area of a triangle using an appropriate formula ● Solve problems involving triangles ● Sketch the graphs of the sine, cosine and tangent functions ● Sketch simple transformations of these graphs 	EOC 9 Test covering <ul style="list-style-type: none"> ● cosine rule ● sine rule ● area of a triangle ● graphs of the sine, cosine and tangent functions ● Sketch simple transformations of these graphs
HALF TERM 4	10. Trigonometric identities and equations	<ul style="list-style-type: none"> ● Calculate the sine, cosine and tangent of any angle ● Know the exact trigonometric ratios for 30°, 45° and 60° ● Know and use the relationships $\tan \theta = \sin\theta/\cos \theta$ and $\sin^2\theta + \cos^2\theta = 1$ ● Solve simple trigonometric equations of the forms $\sin \theta = k$, $\cos \theta = k$ and $\tan \theta = k$ ● Solve more complicated trigonometric equations of the forms $\sin n\theta = k$ and $\sin (\theta \pm \alpha) = k$ and equivalent equations involving cos and tan ● Solve trigonometric equations that produce quadratics 	EOC 10 Test covering <ul style="list-style-type: none"> ● Sin, cos, tan ● exact trigonometric ratios for 30°, 45° and 60° ● relationships $\tan \theta = \sin\theta/\cos \theta$ and $\sin^2\theta + \cos^2\theta = 1$ ● Solve simple trigonometric equations ● $\sin (\theta \pm \alpha) = k$

When?	Chapter	Key Learning Objectives Key Questions	Unit Assessment
	11. Vectors	<ul style="list-style-type: none"> • Use vectors in two dimensions • Use column vectors and carry out arithmetic operations on vectors • Calculate the magnitude and direction of a vector • Understand and use position vectors • Use vectors to solve geometric problems • Understand vector magnitude and use vectors in speed and distance calculations • Use vectors to solve problems in context 	EOC 11 Test covering <ul style="list-style-type: none"> • 2D vectors • Column vectors • Magnitude and direction • Position vectors • Vector problems • vectors in speed and distance calculations •
	12. Differentiation	<ul style="list-style-type: none"> • Find the derivative, $f'(x)$ or dy/dx, of a simple function • Use the derivative to solve problems involving gradients, tangents and normals • Identify increasing and decreasing functions • Find the second order derivative, $f''(x)$ or d^2y/dx^2, of a simple function • Find stationary points of functions and determine their nature • Sketch the gradient function of a given function • Model real-life situations with differentiation 	EOC 12 Test covering <ul style="list-style-type: none"> • $f'(x)$ or dy/dx • gradients, tangents and normal • increasing and decreasing functions • $f''(x)$ or d^2y/dx^2 • stationary points • gradient function • modelling
HALF TERM 5	13. Integration	<ul style="list-style-type: none"> • Find y given dy/dx for x^n • Integrate polynomials • Find $f(x)$, given $f'(x)$ and a point on the curve • Evaluate a definite integral • Find the area bounded by a curve and the x-axis • Find areas bounded by curves and straight lines 	EOC 13 Test covering <ul style="list-style-type: none"> • integrate term by term • definite integrals • bounded area
	14. Exponentials and logarithms	<ul style="list-style-type: none"> • Sketch graphs of the form $y = a^x$, $y = e^x$, and transformations of these graphs • Differentiate e^{kx} and understand why this result is important • Use and interpret models that use exponential functions • Recognise the relationship between exponents and logarithms • Recall and apply the laws of logarithms • Solve equations of the form $a^x = b$ • Describe and use the natural logarithm function • Use logarithms to estimate the values of constants in non-linear models 	EOC 14 Test covering <ul style="list-style-type: none"> • sketch and transform $y = a^x$, $y = e^x$ • Differentiate e^{kx} • laws of logarithms • solve equations using logs • natural logs • modelling