Our Lady Queen of Peace
Catholic Engineering College

Curriculum Overview

Year 11 Higher Mathematics

	Knowledge & Understanding			Subject Specific Literacy Development	Cultural Capital / Enrichment Opportunities
	Composites (Bigger Picture)	**Components (Key Concepts)**	**Recall & Retrieval Practice Focus**	**Key Vocabulary**	
Half Term 1	**Circle Theorems**	Prove and use the facts that: - the angle subtended by an arc at the centre of a circle is twice the angle subtended at any point on the circumference - the angle in a semicircle is a right angle - the perpendicular from the centre of a circle to a chord bisects the chord - angles in the same segment are equal - alternate segment theorem - opposite angles of a cyclic quadrilateral sum to 180°; - Tangent of any point is perpendicular to the radius at that point Find and give reasons for missing angles on diagrams using circle theorems, isosceles triangles (radius properties) in circles, the fact that the angle between a tangent and radius is 90°, the fact that tangents from an external point are equal in length.	Key skills from Y10 HT6 Class specific based on Y10 AC3 QLA	Subtended – Bisects – Cyclic – Segment –	
	Circle Geometry	Find the equation of a tangent to a circle at a given point, by: - finding the gradient of the radius that meets the circle at that point (circles all centre the origin) - finding the gradient of the tangent perpendicular to it - using the given point Recognise and construct the graph of a circle using $x^2 + y^2 = r^2$ for radius r centred at the origin of coordinates.		Perpendicular – Tangent –	
	Vectors and Geometric Proof	Understand and use vector notation, including column notation Understand that 2a is parallel to a and twice its length, and that a is parallel to –a in the opposite direction. Represent vectors, combinations of vectors and scalar multiples in the plane pictorially. Calculate the sum of two vectors, the difference of two vectors and a scalar multiple of a vector using column vectors (including algebraic terms). Find the length of a vector using Pythagoras' Theorem. Calculate the resultant of two vectors. Solve geometric problems in 2D where vectors are divided in a given ratio.		Vector – Scalar – Resultant -	

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		Produce geometrical proofs to prove points are collinear and vectors/lines are parallel.			
	Complex Change of Subject	Change the subject of a formula, including cases where the subject occurs on both sides of the formula, or where a power of the subject appears Change the subject of a formula such as where all variables are in the $\frac{1}{f}=\frac{1}{u}+\frac{1}{v}$ denominators			
Half Term 2	**Algebraic Fractions, Proof, Rationalising**	Rationalise the denominator involving surds Simplify algebraic fractions Multiply and divide algebraic fractions Solve quadratic equations arising from algebraic fractions Solve 'Show that' and proof questions using consecutive integers, squares, even numbers, odd numbers Use function notation Find the inverse of a linear function Find the composite function of two or more functions	Circle Theorems Circle Geometry Vectors Change of Subject	Rationalise – Variables – Function –	
	Graphs	Recognise, sketch & interpret graphs of the reciprocal function State the value of x for which the equation is not defined Recognise, sketch and interpret graphs of exponential functions for positive values of k and integer values of x Use calculators to explore exponential growth and decay Set up, solve and interpret solutions in growth and decay problems Interpret & analyse transformations of graphs of functions and write the functions algebraically Trapezium rule for Quadratic & other graphs Interpret the gradient of linear or non-linear graphs, and estimate the gradient of a quadratic or non-linear graph at a given point by sketching the tangent and finding its gradient Interpret the gradient of a non-linear distance–time graph, estimate the speed at one point in time, from the tangent, and the average speed over several seconds by finding the gradient of the chord Interpret the gradient of a non-linear velocity–time graph, estimate the acceleration at one point in time, from the tangent, and the average acceleration over several seconds by finding the gradient of the chord Interpret the gradient of a linear or non-linear graph in financial contexts and real-life contexts		Reciprocal – Exponential – Non-Linear –	

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Half Term 3	**Direct and Inverse Proportion**	Recognise and interpret graphs showing direct and inverse proportion Identify direct proportion from a table of values, by comparing ratios of values, for x squared and x cubed relationships Set up and use equations to solve word and other problems involving direct and inverse proportion Use y = kx to solve direct proportion problems, including questions where students find k, and then use k to find another value Solve problems involving inverse proportion using graphs by plotting and reading values from graphs Solve problems involving inverse proportionality	Key skills from HT1 & 2 Class specific based on QLA		
	Bespoke Scheme of Work	Content based on Question Level Analysis from Rehearsal Exam 1			
Half Term 4	**Bespoke Scheme of Work**	Content based on Question Level Analysis from Rehearsal Exam 2	Class specific based on QLA		
Half Term 5	**Bespoke Scheme of Work**	Content based on Question Level Analysis from Rehearsal Exam 2	Class specific based on QLA		

Key Assessments			
When	**What will be assessed?**	**Why is this being assessed?**	**How will results be stored & students receive feedback?**
HT1	Use the fact that the angle in a semicircle is a right angle to find a missing angle. Use the fact that the angle subtended by an arc at the centre of a circle is twice the angle subtended at any point on the circumference to find a missing angle. Use the fact that opposite angles of a cyclic quadrilateral sum to 180° to find missing angles. Use the fact that the angle between a tangent and radius is 90° to find missing angles. Use alternate segment theorem to find missing angles. Use the fact the fact that tangents from an external point are equal in length to find missing angles. Use a combination of circle theorems to answer a multi-step question. Identify the co-ordinates of the centre and the radius given the equation of a circle Write down the equation of a circle given the centre point and radius Find the x-value of a co-ordinate given the equation of a circle and the y-value. Calculate the gradient of the radius that meets the circle at a given point on a circle Calculate the gradient of the tangent perpendicular to the radius of the circle Calculate the equation of the tangent to the circle at a given point	To assess the students understanding of and their retention of the topics taught. This information will be used to inform the topics that make up the Weekly Skills and 4L's.	Scores will be stored on SIMS and student feedback will be through action feedback questions. Class based understanding will be monitored through a QLA to compare outcomes for classes.
HT2	Rehearsal Exam 1	To assess the students understanding of the topics taught which will inform the content that makes up the bespoke scheme of work for each class.	
HT3	Vectors and Geometric Proof Complex Changing the Subject Algebraic Fractions Surds Graphs Direct and Inverse Proportion	To assess the students understanding of and their retention of the topics taught. This information will be used to inform the topics that make up the Weekly Skills and 4L's.	
HT3/4	Rehearsal Exam 2	To assess the students understanding of the topics taught which will inform the content that makes up the bespoke scheme of work for each class.	