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| **Our Lady Queen of Peace**  Catholic Engineering College | Curriculum Overview |
| Year 11 Higher Mathematics | |

|  | **Knowledge & Understanding** | | | **Subject Specific Literacy Development** | **Cultural Capital / Enrichment Opportunities** |
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|  | **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 x2 + y2 = r2 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.  Produce geometrical proofs to prove points are collinear and vectors/lines are parallel. | Vector –  Scalar –  Resultant - |
| 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  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 – |
| **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 |  |  |
| **Half Term 6** |  |  |  |  |  |

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| 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 individualised Fix IT Questions for misconceptions and Reteach lesson for larger class gaps. |
| 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. |