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| **Our Lady Queen of Peace**Catholic Engineering College | Curriculum Overview |
| Year 10 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** | Basic and Real-Life Graphs | Draw and interpret straight-line graphs Draw distance–time and velocity–time graphsUse graphs to calculate various measures Find the coordinates of the midpoint of a line segment with a diagram given and coordinatesCalculate the length of a line segment given the end points . | Key skills from Y9 HT6Class specific based on Y9 AC3 QLA | Midpoint – Quadrant – Line Segment –  |  |
| Linear Graphs and Coordinate Geometry | Plot and draw graphs of y = a, x = a, y = x and y = –xIdentify and interpret the gradient of a line segmentRecognise that equations of the form y = mx + c correspond to straight-line graphs Identify & interpret the gradient and y-intercept of a linear graph Find the equation of a straight line from a graph in the form y = mx + cPlot, draw accurately & sketch graphs of straight linesFind the equation of the line : one point and a given gradientIdentify and interpret gradient from an equation ax + by = cFind the equation of a straight line from a graph and plot/draw graphs in the form ax + by = cGenerate equations of lines parallel and perpendicular to the given lineUse the fact that when y = mx + c is the equation of a straight line, then the gradient of a line parallel to it will have a gradient of m and a line perpendicular to this line will have a gradient of $-\frac{1}{m}$ | Parallel – Gradient – y-intercept – Perpendicular –  |
| Quadratic, Cubic and Other Graphs | Recognise a linear, quadratic, cubic, reciprocal & circle graphsGenerate points and plot graphs of quadratic functionsFind approximate solutions of a quadratic equation from the graph of the corresponding quadratic functionDraw graphs of simple cubic functions using tables of valuesDraw graphs of the reciprocal functionDraw circles that are centred around the origin | Quadratic – Linear – Cubic –  |
| Transformation | Perform and describe rotations Identify the equation of a line of symmetryDescribe and perform reflections on a coordinate grid Perform and describe translations using column vectorsDescribe and transform 2D shapes using enlargements by a positive integer, positive fractional, and negative scale factor; Describe and transform 2D shapes using combined rotations, reflections, translations, or enlargementsDescribe the changes and invariance achieved by combinations of rotations, reflections and translations | Rotations –Translations – Enlargements –  |
| **Half Term 2** | 3D Forms and Volume inc. Cylinders, Cones and Spheres | Find the surface area of prisms Convert between metric volume measures and capacityUse volume to solve problemsFind the volume and surface area of a cylinderUse the formula for surface area and volume of a pyramidUse the formulae for volume and surface area of spheres and conesSolve problems involving more complex shapes and solids, including segments of circles and frustums of conesFind the surface area and volumes of compound solids constructed from cubes, cuboids, cones, pyramids, spheres, hemispheres, cylindersGive answers to an appropriate degree of accuracy or in terms of πForm equations involving more complex shapes and solve these equations. |  | Surface Area – Frustums – Prism –  |  |
| Similarity and Congruence | Understand and use SSS, SAS, ASA and RHS conditions to prove the congruence of triangles Understand similarity of trianglesProve that two shapes are similar by giving the scale factorUnderstand the effect of enlargement on angles, perimeter, area and volume of shapes and solidsIdentify the scale factor of an enlargement of a similar shape as the ratio of the lengths of two corresponding sides, using integer or fraction scale factorsWrite the lengths, areas and volumes of two shapes as ratios in their simplest formFind missing lengths, areas and volumes in similar 3D solidsKnow the relationships between linear, area and volume scale factors of mathematically similar shapes and solidsSolve problems involving frustums of cones where you have to find missing lengths first using similar triangles | Congruence – Similarity – Scale Factor –   |
| Accuracy and Bounds | Calculate the upper and lowers bounds of numbers given to varying degrees of accuracyCalculate the upper and lower bounds of an expression involving the four operationsFind the upper and lower bounds in real-life situations using measurements and perimeters, areas, and volumes of 2D and 3D shapes given to appropriate degrees of accuracyUse inequality notation to specify an error interval due to truncation or rounding. | Bound Error interval  |
| **Half Term 3** | Compound Measures and Multiplicative Reasoning | Understand and use compound measures and convert between metric speed measures, density measures and pressure measures;Use kinematics formulae from the formulae sheet to calculate speed, acceleration, etc Express a multiplicative relationship between two quantities as a ratio or a fractionSolve proportion problems using the unitary methodWork out which product offers best value and consider rates of payWork out the multiplier for repeated proportional change as a single decimal numberSolve problems involving compound interest and depreciation; | Key skills from HT1 & 2Class specific based on QLA | Best Value – Multiplier – Density – Pressure –  |  |
| Solving Quadratic Equations | Factorise quadratic expressions in the form ax2 + bx + cSolve quadratic equations by factorisation and completing the squareSolve quadratic equations that need rearrangingSet up and solve quadratic equationsSolve quadratic equations by using the quadratic formula | Quadratic – Factorisation –  |
| Simultaneous Equations | Find the exact solutions of two simultaneous equations in two unknowns using elimination or substitution to solve simultaneous equationsSolve exactly, by elimination of an unknown, two simultaneous equations in two unknowns including linear / quadratic and linear / x2 + y2 = r2;Set up and solve a pair of linear simultaneous equations in two variables, including to represent a situationInterpret the solution in the context of the problem | Unknowns – Elimination –  |
| **Half Term 4** | Inequalities | Show inequalities on number linesWrite down whole number values that satisfy an inequalitySolve simple linear inequalities in one variable Solve two linear inequalities in x, find the solution sets and compare them to see which value of x satisfies bothUse the correct notation to show inclusive and exclusive inequalities | Key skills from HT2 & 3Class specific based on QLA | Inequalities – Number line –  |  |
| Quadratics | Sketch a graph of a quadratic function, identifying roots, y-intercept and turning pointBe able to identify from a graph if a quadratic equation has any real rootsFind approximate solutions to quadratic equations using a graphExpand the product of more than two linear expressionsSketch a graph of a quadratic function and a linear function, identifying intersection pointsSolve simultaneous equations graphicallySolve quadratic inequalities in one variable, by factorising and sketching the graph to find critical valuesSolve linear inequalities in two variables graphicallyShow the solution set of several inequalities in two variables on a graphsUse iteration with simple converging sequences | Turning point – Intersection – Iteration –  |
| Graphs of Trigonometric Functions | Recognise, sketch and interpret graphs of the trigonometric functions, y = sin x, y = cos x and y = tan x for angles of any sizeKnow the exact values of sin θ, cos θ and tan θ for θ = 0°, 30°, 45° , 60° and 90°Apply to the graph of y = f(x) the transformations y = f(x) + a, y = f(x + a), y = –f(x), y = f(–x) for sine, cosine and tan functions f(x) | Function – Exact value –  |
| **Half Term 5** | Further Trigonometry | Know and apply Area = ½ ab sin C to calculate the area, sides or angles of any triangleKnow the sine and cosine rules, and use to solve 2D problems (including involving bearings).Use the sine and cosine rules to solve 3D problems.Solve geometrical problems on coordinate axes. Use trigonometric relationships and Pythagoras’ Theorem in right-angled triangles to solve problems in 3D configurations. Calculate the length of a diagonal of a cuboid. Find the angle between a line and a plane. | Key skills from HT3 & 4Class specific based on QLA | Cosine – Sine -  |  |
| Collecting Data | Specify the problem and plan; decide what data to collect and what analysis is needed, understand primary and secondary data sources, consider fairnessUnderstand what is meant by a sample and a populationUnderstand how different sample sizes may affect the reliability of conclusions drawnIdentify possible sources of bias and plan to minimise itWrite questions to eliminate bias, and understand how the timing and location of a survey can ensure a sample is representative | Primary – Secondary – Sample – Bias –Survey –  |
| Cumulative Frequency, Box Plots, Histograms | Know the appropriate uses of cumulative frequency diagramsConstruct and interpret cumulative frequency tables and graphsCompare the mean and range of two distributions, or median and interquartile rangeDraw and interpret box plots to find median, quartiles, range and interquartile range and draw conclusionsKnow the appropriate uses of histogramsConstruct and interpret histograms from class intervals with unequal widthFrom histograms: complete a grouped frequency table;understand and define frequency density; Estimate the mean from a histogramEstimate the median from a histogram with unequal class widths or any other information from a histogram, such as the number of people in a given interval. | Cumulative – Frequency –Distribution – Quartile –  |
| **Half Term 6** | Probability | Estimate the number of times an event will occur, given the probability and the number of trialsFind the probability of successive events, such as several throws of a single diceKnow that the sum of the probabilities of all outcomes is 1Work out probabilities from Venn diagrams to represent real-life situations and also ‘abstract’ sets of numbers/valuesUse union and intersection notationUnderstand conditional probabilities and decide if two events are independentDraw a probability tree diagram based on given information, and use this to find probability and expected number of outcome Calculate the probability of independent and dependent combined eventsUse a Venn diagram and a tree diagram to calculate conditional probability Compare experimental data and theoretical probabilitiesCompare relative frequencies from samples of different sizes  | Key skills from HT4 & 5Class specific based on QLA | Experimental – Outcome – Event – Sample Space –  |  |

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| Key Assessments |
| **When** | **What will be assessed?** | **Why is this being assessed?** | **How will results be stored & students receive feedback?** |
| Interim 1 (HT1) | Basic and Real Life GraphsLinear Graphs and Coordinate Geometry | 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 recall and retention starter activiites. | Scores will be stored on SIMS and student feedback will be through individualised Fix IT Questions. |
| Interim 2 (HT2) | Quadratic and Cubic GraphsTransformations3D Volumes inc. Cones and Spheres |
| Interim 3 (HT3) | Similarity and CongruenceAccuracy and BoundsCompound MeasuresMultiplicative ReasoningSolving Quadratic Equations |
| Interim 4 (HT4) | Simultaneous EquationsInequalities |
| Interim 5 (HT5) | QuadraticsFurther TrigonometryTrigonometric Graphs |
| Midyear Assessment | Assess all content across the Y10H scheme covered at time of assessment. | Summative assessment to assess the students understanding of and their retention of the topics taught. Progress tracked against expectations and intervention put in place where needed. This information will be used to inform the topics that make up the recall and retention starter activities. | Teacher marks, results stored on SIMs. Fix It lesson for induvial quick fixes, reteach lesson for larger topics.Possible retest after optional sessions to correct misconceptions.Students self-fill a Success Criteria to identify areas of strength and development moving forward. |
| End of Year Assessment |
| Topic Tasks(aprrox. 10) | Assess recently learnt topics over the last 3-4 weeks. | More formal formative assessment to track the understanding and retention of students with recently learnt topics to better impact long term progress and possession of knowledge. | Teacher marked with areas of success and development highlighted for students. Students address small misconceptions with a Fix It, larger gaps across the class are given a reteach lesson. |