

## Year 11 Higher Maths Curriculum Map

Sequencing of topics	What knowledge will students develop? (Including key terminology)	What skills will students develop? (Including literacy & numeracy)	Assessment opportunities	Homework opportunities	Personal development (Ursuline Values, Catholic Social Teaching, Cultural Capital, Cross-curricular, Careers)	Curriculum Links
Autumn Term						
Sampling and more complex diagrams	<ul style="list-style-type: none"> <li>• Collecting data</li> <li>• Frequency polygons</li> <li>• Cumulative frequency graphs</li> <li>• Box plots</li> <li>• Histograms</li> </ul>	<ul style="list-style-type: none"> <li>• Understand sampling.</li> <li>• Collect unbiased reliable data for a sample.</li> <li>• Draw and interpret frequency polygons.</li> <li>• Draw and interpret cumulative frequency graphs.</li> <li>• Draw and interpret box plots.</li> <li>• Draw and interpret histograms where the bars are of equal width.</li> <li>• Draw and interpret histograms where the bars are of unequal width.</li> <li>• Calculate the median, quartiles and interquartile range from a histogram.</li> </ul>	End of topic assessment	Textbook (Collins) Mathswatch Other online resources  These include: <ul style="list-style-type: none"> <li>• Videos</li> <li>• Practice questions</li> <li>• Past exam questions</li> <li>• Differentiated activities.</li> </ul> Research opportunities: <ol style="list-style-type: none"> <li>1. Designing and conducting a survey or experiment using appropriate sampling methods.</li> <li>2. Creating complex</li> </ol>	<p><b>Listening and Attentive:</b> Sampling involves carefully selecting a subset of data to represent a larger population, requiring attentive observation and consideration of various factors.</p> <p><b>Faith-filled and Hopeful:</b> Embracing more complex diagrams involves believing in the power of mathematical reasoning and having hope in finding solutions to intricate problems.</p> <p style="color: green;">Preferential Option for the Poor and Vulnerable Stewardship Solidarity Common Good</p> <p style="color: blue;">Understanding different sampling techniques used in social sciences, such as survey sampling or ethnographic sampling.</p> <p style="color: blue;">Familiarity with historical diagrams that have had a significant impact, such as flowcharts or organizational charts.</p>	Probability Data Analysis and Statistics

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				<p>diagrams to represent data or visualize concepts in a research project.</p>	<p>Science (scientific experiments and data collection methods).                      Geography (geographic mapping and spatial analysis).                      Business Studies (market research and data analysis).</p> <p>Statistician                      Market Research Analyst                      Data Scientist                      Data Visualization Specialist                      Graphic Designer</p>	
<p>Combined events</p>	<ul style="list-style-type: none"> <li>• Addition rules for outcomes of events</li> <li>• Combined events</li> <li>• Tree diagrams</li> <li>• Independent events</li> <li>• Conditional probability</li> </ul>	<ul style="list-style-type: none"> <li>• Work out the probability of different outcomes of combined events.</li> <li>• Work out the probability of two outcomes or events occurring at the same time.</li> <li>• Use tree diagrams to work out the probability of combined events.</li> <li>• Use the connectors 'and' and 'or' to work out the probabilities for combined events.</li> <li>• Work out the probability of combined events when</li> </ul>	<p>End of topic assessment</p>	<p>Textbook (Collins)                      Mathswatch                      Other online resources</p> <p>These include:</p> <ul style="list-style-type: none"> <li>• Videos</li> <li>• Practice questions</li> <li>• Past exam questions</li> <li>• Differentiated activities.</li> </ul> <p>Research opportunities:</p> <ul style="list-style-type: none"> <li>• Solving problems involving</li> </ul>	<p>United in Harmony                      Discerning and Joyful                      Grateful and Generous</p> <p>Common Good                      Option for the Poor and Vulnerable</p> <p>Familiarity with real-world scenarios involving independent events, such as coin tosses or rolling dice.</p> <p>Knowledge of statistical studies and experiments that involve conditional probability.</p> <p>Biology (genetic traits)                      Social Sciences</p> <p>Actuary</p>	<p>Set Theory                      Combinatorics</p>

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		the probabilities change after each event.		independent events and conditional probability in real-world contexts.	<p>Financial Analyst Data Scientist Epidemiologist</p>	
Properties of circles	<ul style="list-style-type: none"> <li>• Circle theorems</li> <li>• Cyclic quadrilaterals</li> <li>• Tangents and chords</li> <li>• Alternate segment theorem</li> </ul>	<ul style="list-style-type: none"> <li>• Work out the size of angles in circles.</li> <li>• Find the size of angles in cyclic quadrilaterals.</li> <li>• Use tangents and chords to find the size of angles in circles.</li> <li>• Use the alternate segment theorem to find the size of angles in circles.</li> </ul>	End of topic assessment	<p>Textbook (Collins) Mathswatch Other online resources</p> <p>These include:</p> <ul style="list-style-type: none"> <li>• Videos</li> <li>• Practice questions</li> <li>• Past exam questions</li> <li>• Differentiated activities.</li> </ul> <p>Research opportunities:</p> <ul style="list-style-type: none"> <li>• Investigating the relationships between the radius, diameter, circumference, and area of circles through mathematical</li> </ul>	<p>Discerning and Joyful Faith-filled and Hopeful</p> <p>Solidarity Stewardship</p> <p>Understanding the use of circles in various fields, including engineering, astronomy, and design.</p> <p>Science: Exploring the relationship between circles and concepts like orbits or waves.</p> <p>Art: Incorporating circular elements in designs or exploring the use of circles in perspective drawing.</p> <p>Architecture Engineering Astronomy</p>	Geometry Trigonometry

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				proofs or real-life applications.		
Variation	<ul style="list-style-type: none"> <li>• Direct proportion</li> <li>• Inverse proportion</li> </ul>	<ul style="list-style-type: none"> <li>• Work out the constant of proportionality.</li> <li>• Solve problems where two variables have a directly proportional or an inversely proportional relationship.</li> </ul>	<p>End of topic assessment</p> <p>Mock Exams</p>	<p>Textbook (Collins) Mathswatch Other online resources</p> <p>These include:</p> <ul style="list-style-type: none"> <li>• Videos</li> <li>• Practice questions</li> <li>• Past exam questions</li> <li>• Differentiated activities.</li> </ul> <p>Research opportunities:</p> <ul style="list-style-type: none"> <li>• Investigating real-life scenarios where direct and inverse proportionality is applicable.</li> </ul>	<p>Grateful and Generous Discerning and Joyful</p> <p>Solidarity Option for the Poor and Vulnerable</p> <p>Understanding historical and cultural contexts where direct and inverse proportionality played a significant role, such as in trade or resource distribution.</p> <p>Familiarity with real-life examples of direct and inverse proportion, such as scaling recipes or calculating rates of speed.</p> <p>Science (physical laws or chemical reactions). Economic (supply and demand or price elasticity).</p> <p>Financial Analyst Environmental Scientist</p>	<p>Algebra Graph Theory</p>
Spring Term						
Triangles	<ul style="list-style-type: none"> <li>• Further 2D and 3D problems</li> </ul>	<ul style="list-style-type: none"> <li>• Use trigonometric ratios and Pythagoras' theorem to solve more</li> </ul>	<p>End of topic assessment</p>	<p>Textbook (Collins) Mathswatch</p>	<p>Discerning and Joyful Faith-filled and Hopeful</p>	<p>Geometry Trigonometry</p>

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	<ul style="list-style-type: none"> <li>• Trigonometric ratios of angles between <math>0^\circ</math> and <math>360^\circ</math></li> <li>• Solving any triangle</li> <li>• Using sine to find the area of any triangle</li> </ul>	<p>complex two and three-dimensional problems.</p> <ul style="list-style-type: none"> <li>• Use the sine rule and the cosine rule to find sides and angles in any triangle.</li> <li>• Work out the area of a triangle if you know two sides and the included angle.</li> </ul>		<p>Other online resources</p> <p>These include:</p> <ul style="list-style-type: none"> <li>• Videos</li> <li>• Practice questions</li> <li>• Past exam questions</li> <li>• Differentiated activities.</li> </ul> <p>Research opportunities:</p> <ul style="list-style-type: none"> <li>• Solving real-life problems involving triangles using the sine and cosine rule.</li> </ul>	<p>Solidarity Dignity of the Human Person</p> <p>Understanding how trigonometric concepts are represented and used in different fields, such as music, physics, or computer graphics.</p> <p>Physics (analysing forces and vectors). Music (sound waves and harmonics).</p> <p>Engineering Architecture Surveying</p>	
Graphs	<ul style="list-style-type: none"> <li>• Distance–time graphs</li> <li>• Velocity–time graphs</li> <li>• Estimating the area under a curve</li> <li>• Rates of change</li> <li>• Equation of a circle</li> <li>• Other graphs</li> </ul>	<ul style="list-style-type: none"> <li>• Interpret distance–time graphs</li> <li>• Draw a graph of the depth of liquid as a container is filled.</li> <li>• Read information from a velocity–time graph.</li> <li>• Work out the distance travelled and</li> </ul>	End of topic assessment	<p>Textbook (Collins) Mathswatch Other online resources</p> <p>These include:</p> <ul style="list-style-type: none"> <li>• Videos</li> </ul>	<p>United in Harmony Listening and Attentive</p> <p>Option for the Poor and Vulnerable Care for Creation</p> <p>Recognizing how different cultures represent and interpret motion and speed through visual representations and storytelling.</p>	Calculus Algebra

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	<ul style="list-style-type: none"> <li>Transformation of the graph <math>y = f(x)</math></li> </ul>	<p>acceleration from a velocity–time graph.</p> <ul style="list-style-type: none"> <li>Use areas of rectangles, triangles and trapeziums to estimate the area under a curve.</li> <li>Interpret the meaning of the area under a curve.</li> <li>Draw a tangent at a point on a curve and use it to work out the gradient at a point on a curve</li> <li>Interpret the gradient at a point on a curve.</li> <li>Find the equation of a tangent to a circle.</li> <li>Recognise and plot cubic, exponential and reciprocal graphs.</li> <li>Transform a graph.</li> </ul>		<ul style="list-style-type: none"> <li>Practice questions</li> <li>Past exam questions</li> <li>Differentiated activities.</li> </ul> <p>Research opportunities:</p> <ul style="list-style-type: none"> <li>Analysing real-world scenarios and creating distance-time and velocity-time graphs to understand and predict motion.</li> </ul>	<p>Physics (speed, acceleration, and displacement). Physical Education (performance in various sports activities).</p> <p>Sports Science Transportation Planning</p>	
Summer Term						
Algebraic fractions and functions	<ul style="list-style-type: none"> <li>Algebraic fractions</li> <li>Changing the subject of a formula</li> <li>Functions</li> <li>Composite functions</li> <li>Iteration</li> </ul>	<ul style="list-style-type: none"> <li>Simplify algebraic fractions</li> <li>Solve equations containing algebraic fractions.</li> <li>Change the subject of a formula where the subject occurs more than once.</li> </ul>	<p>End of topic assessment</p> <p>GCSE Examinations</p>	<p>Textbook (Collins) Mathswatch Other online resources</p> <p>These include:</p> <ul style="list-style-type: none"> <li>Videos</li> <li>Practice questions</li> </ul>	<p>United in Harmony Discerning and Joyful</p> <p>Dignity of the Human Person Solidarity Preferential Option for the Poor and Vulnerable</p> <p>Understanding how different cultures and societies have</p>	<p>Algebra Statistics Calculus</p>

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		<ul style="list-style-type: none"> <li>• Find the output of a function.</li> <li>• Find the inverse function.</li> <li>• Find the composite of two functions.</li> <li>• Find an approximate solution for an equation using the process of iteration.</li> </ul>		<ul style="list-style-type: none"> <li>• Past exam questions</li> <li>• Differentiated activities.</li> </ul> <p>Research opportunities:</p> <ul style="list-style-type: none"> <li>• Solving complex algebraic fraction problems and equations.</li> <li>• Investigating different types of functions and their properties.</li> </ul>	<p>developed and applied algebraic fractions in various mathematical and scientific disciplines.</p> <p>Familiarity with significant functions and their applications in fields such as physics, engineering, or economics.</p> <p>Science (chemical equations and calculations in chemistry). Economics (modelling and analysis). Physics Computer Science (algorithm design and programming).</p> <p>Actuary Financial Analyst Data Scientist Software Engineer</p>	
Vector geometry	<ul style="list-style-type: none"> <li>• Properties of vectors</li> <li>• Vectors in geometry</li> </ul>	<ul style="list-style-type: none"> <li>• Add and subtract vectors.</li> <li>• Use vectors to solve geometric problems.</li> </ul>	End of topic assessment	<p>Textbook (Collins) Mathswatch Other online resources</p> <p>These include:</p> <ul style="list-style-type: none"> <li>• Videos</li> <li>• Practice questions</li> </ul>	<p>United in Harmony Courageous and Resilient</p> <p>Solidarity Care for God's Creation</p> <p>Familiarity with prominent mathematicians and physicists who have made significant contributions to vector geometry, such as Euclid or Isaac Newton.</p>	Calculus Linear Algebra

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				<ul style="list-style-type: none"><li>• Past exam questions</li><li>• Differentiated activities.</li></ul> <p>Research opportunities:</p> <ul style="list-style-type: none"><li>• Solving problems involving vector operations, such as addition, subtraction, and scalar multiplication.</li><li>• Conducting research on the applications of vector geometry in various scientific and engineering disciplines.</li></ul>	<p>Physics (motion, forces, and electromagnetic fields). Engineering (sign and analysis of structures and mechanical systems).</p> <p>Aerospace Engineer Architect</p>	
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