



Unit:	Lesson Sequence		
	<p><b>Pythagoras' Theorem</b></p> <ol style="list-style-type: none"> <li>Solve equations with squares and square roots</li> <li>Identify the hypotenuse</li> <li>Determine whether a triangle is right-angled</li> <li>Pythagoras' theorem (find the hypotenuse)</li> <li>Pythagoras' theorem (find any side)</li> <li>Use Pythagoras' theorem on coordinate axes</li> <li>Proofs of Pythagoras' theorem (E)</li> <li>Pythagoras' theorem in 3-D shapes (E)</li> </ol>	<p><b>Non-Linear Graphs</b></p> <ol style="list-style-type: none"> <li>Substitute into quadratic expressions</li> <li>Draw quadratic graphs</li> <li>Draw more complex quadratic graphs</li> <li>Interpret quadratic graphs</li> <li>Interpret reciprocal and exponential graphs</li> <li>Draw cubic graphs (E)</li> <li>Interpret cubic graphs (E)</li> <li>Interpret roots, intercepts and turning points (E)</li> </ol>	<p><b>Probability</b></p> <ol style="list-style-type: none"> <li>Identify and represent sets</li> <li>Intersection of a set</li> <li>Union of a set</li> <li>Complement of a set (E)</li> <li>Probability of a single event</li> <li>Use diagrams to work out probabilities</li> <li>Relative frequency</li> <li>Expected outcomes</li> <li>Independent events</li> </ol>
<p><b>Knowledge &amp; Skills development</b></p>	<p><b>Fluency</b></p> <ul style="list-style-type: none"> <li>Recall and apply the Pythagoras' theorem formula accurately</li> <li>Calculate the length of any side in a right-angled triangle quickly</li> <li>Recognize right-angled triangles in different orientations or contexts</li> </ul> <p><b>Reasoning</b></p> <ul style="list-style-type: none"> <li>Explain why Pythagoras' theorem works using geometric or algebraic proofs</li> <li>Understand the conditions under which the theorem applies (only right-angled triangles)</li> <li>Reason about the relationship between side lengths and use this to determine if a triangle is right-angled</li> </ul> <p><b>Problem-Solving</b></p>	<p><b>Fluency</b></p> <ul style="list-style-type: none"> <li>Recognize different types of non-linear graphs such as quadratic, cubic, exponential, and reciprocal graphs</li> <li>Plot points and sketch basic non-linear graphs accurately using given equations or data</li> <li>Identify key features like turning points, intercepts, and asymptotes</li> </ul> <p><b>Reasoning</b></p> <ul style="list-style-type: none"> <li>Explain the shape and behaviour of graphs based on the algebraic form of the equation</li> <li>Interpret what features of the graph represent in context, such as maxima, minima, or rates of change</li> <li>Analyse how changes in parameters affect the graph's shape and position</li> </ul> <p><b>Problem-Solving</b></p>	<p><b>Fluency</b></p> <ul style="list-style-type: none"> <li>Calculate probabilities of single and multiple events accurately</li> <li>Understand and use probability scales from 0 to 1 or 0% to 100%</li> <li>Use basic probability rules such as complementary events and mutually exclusive events</li> </ul> <p><b>Reasoning</b></p> <ul style="list-style-type: none"> <li>Explain why probabilities add up to 1 and how this affects calculations</li> <li>Interpret and compare probabilities to determine the likelihood of events</li> <li>Use reasoning to predict outcomes based on probability models or experimental data</li> </ul> <p><b>Problem-Solving</b></p> <ul style="list-style-type: none"> <li>Solve problems involving combined events using addition and multiplication rules</li> </ul>

	<ul style="list-style-type: none"> <li>Solve problems involving missing sides in right-angled triangles in various contexts</li> <li>Apply the theorem in multi-step problems, such as finding distances in 2D coordinate geometry or real-life situations like construction</li> <li>Use Pythagoras' theorem alongside other geometry concepts like trigonometry or similarity to solve complex problems</li> <li>Verify answers by checking calculations and considering the context of the problem</li> </ul>	<ul style="list-style-type: none"> <li>Use non-linear graphs to solve real-world problems, such as modelling growth or decay, and optimization tasks</li> <li>Find approximate solutions to equations by interpreting where graphs intersect or reach certain values</li> <li>Combine graphing with algebraic methods to solve complex problems involving curves</li> <li>Evaluate the reasonableness of solutions by relating graph behaviour to the problem context</li> </ul>	<ul style="list-style-type: none"> <li>Apply probability concepts to real-life contexts such as games, risk assessment, or decision making</li> <li>Analyse and interpret data from experiments or simulations to estimate probabilities</li> <li>Evaluate the fairness of games or likelihood of outcomes using probability reasoning</li> </ul>
<b>Assessment / Feedback Opportunities</b>	<b>Formative Assessment</b> Assessment for learning is integrated throughout each small step with suggested questions, activities and checks for understanding that are adapted for the setting.		<b>Summative assessment</b> Summative assessment includes end of block assessments and mark schemes as well as interleaved end of term assessments and mark schemes.
<b>Key Vocabulary</b>	Pythagoras' theorem, right-angled triangle, hypotenuse, opposite side, adjacent side, square, square root, calculate, length, distance, formula, triangle, perpendicular, base, height, solve, measure	Non-linear, curve, quadratic graph, parabola, vertex, maximum, minimum, axis of symmetry, intercept, gradient, increasing, decreasing, turning point, graph, coordinates, equation, polynomial	Probability, experiment, outcome, event, sample space, certain, impossible, likely, unlikely, equally likely, fair, biased, random, independent events, dependent events, mutually exclusive, frequency, relative frequency, theoretical probability, experimental probability, probability scale, tree diagram, Venn diagram
<b>Personal Development (Including British Values, RSE, Citizenship)</b>	Exploring expected outcomes, independent events, and relative frequency supports PSHE NC H32 and H25, helping students understand the real risks associated with gambling and resist common thinking errors like the gambler's fallacy. These lessons can help challenge misconceptions about "winning streaks" and highlight the unpredictability of chance-based games. Teaching probability through diagrams and real-life scenarios also supports PSHE NC L15, as students learn to assess and manage risks in financial decisions, and PSHE NC H31, by encouraging them to make safer choices in situations affecting their health and wellbeing. Additionally, applying probability to digital scenarios—such as the likelihood of encountering false information online—can link with PSHE NC L24–L26, helping students question how media content and targeted advertising might influence their perceptions and decisions. In this way, probability becomes a powerful tool for promoting informed, reflective decision-making in both mathematical and personal contexts.		

<b>Career Opportunities</b>	<p>Topics of Pythagoras' Theorem, Non-Linear Graphs, and Probability are linked to careers that require spatial understanding, advanced modelling, and risk assessment. Pythagoras' Theorem is fundamental in professions such as architecture, engineering, construction, and surveying, where precise measurements and spatial relationships are critical. It helps professionals calculate distances, design structural elements, and ensure accurate layouts in both two- and three-dimensional spaces.</p> <p>Non-Linear Graphs are essential in scientific research, economics, and data analysis. Scientists use these graphs to model natural phenomena such as population growth, chemical reactions, or motion under gravity. Economists apply them to represent supply and demand curves or trends in market behaviour that don't follow a straight line. Software developers and engineers often use non-linear models when working on algorithms, simulations, or systems that involve exponential growth or decay.</p> <p>Probability plays a key role in careers that involve predicting outcomes and managing uncertainty. Statisticians, data analysts, and actuaries use probability to assess risk, make forecasts, and inform decisions in fields like insurance, finance, and healthcare. In medicine, probability helps in determining the likelihood of treatment success or disease spread. In gaming and artificial intelligence, developers use probability to create realistic models, simulations, or decision-making processes.</p>
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