



Essential Knowledge	Teaching Points
<ul style="list-style-type: none"> Understand, recall and use Pythagoras' Theorem in 2D, including leaving answers in surd form; Given 3 sides of a triangle, justify if it is right-angled or not; Calculate the length of the hypotenuse in a right-angled triangle, including decimal lengths and a range of units; Find the length of a shorter side in a right-angled triangle; Apply Pythagoras' Theorem with a triangle drawn on a coordinate grid; Calculate the length of a line segment AB given pairs of points; Understand, use and recall the trigonometric ratios sine, cosine and tan, and apply them to find angles and lengths in general triangles in 2D figures; Use the trigonometric ratios to solve 2D problems; Find angles of elevation and depression; Round answers to appropriate degree of accuracy, either to a given number of significant figures or decimal places, or make a sensible decision on rounding in context of question; Know the exact values of $\sin \theta$ and $\cos \theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ$ and 90°; know the exact value of $\tan \theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ$ and 60°. 	<ul style="list-style-type: none"> Students may need reminding about surds. Drawing the squares on the 3 sides will help to illustrate the theorem. Include examples with triangles drawn in all four quadrants. Scale drawings are not acceptable. Remind students calculators need to be in degree mode. Use a suitable method to find the exact values of $\sin \theta$ and $\cos \theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ$ and 90°, Use examples of triangles with angles of $30^\circ, 45^\circ$ and 60° for students to practice exact trigonometry values. Use a suitable mnemonic to remember SOHCAHTOA. Use Pythagoras' Theorem and trigonometry together so students can identify which method should be used in each case. Revisit bearings and link to angles of elevation and depression
Assumed Prior Knowledge/ Links / Interleaving	
<ul style="list-style-type: none"> Students should recall basic angle facts. Students should be able to rearrange simple formulae and equations, as preparation for rearranging trigonometric formulae Students should understand when to leave an answer in surd form. Students should be able to plot coordinates in all four quadrants and draw axes. 	

Potential Barriers to Access / Misconceptions		Opportunities for Reasoning/Problem Solving/Proofs	
<ul style="list-style-type: none"> • Answers may be displayed on a calculator in surd form. • Students forget to square root their final answer or round their answer prematurely. • Students do not round their answers to an appropriate degree of accuracy, specified in the questions • Some students limited knowledge of significant figures means they cannot round answers appropriately 		<ul style="list-style-type: none"> • Combined triangle problems that involve consecutive application of Pythagoras' Theorem or a combination of Pythagoras' Theorem and the trigonometric ratios. • In addition to abstract problems, students should be encouraged to apply Pythagoras' Theorem and/or the trigonometric ratios to real-life scenarios that require them to evaluate whether their answer fulfils certain criteria, e.g. the angle of elevation of 6.5 m ladder cannot exceed 65°. What is the greatest height it can reach? • Include questions where students have to draw diagrams themselves. • Links to bearings would be useful 	
Key Mathematical Vocabulary	Triangle, right angle, angle, Pythagoras' Theorem, sine, cosine, tan, trigonometry, opposite, hypotenuse, adjacent, ratio, elevation, depression, length, accuracy		