



Essential Knowledge	Teaching Points
<ul style="list-style-type: none"> <li>Factorise quadratic expressions in the form <math>ax^2 + bx + c</math>;</li> <li>Solve quadratic equations by factorisation and completing the square;</li> <li>Solve quadratic equations that need rearranging;</li> <li>Set up and solve quadratic equations;</li> <li>Solve quadratic equations by using the quadratic formula;</li> <li>Find the exact solutions of two simultaneous equations in two unknowns;</li> <li>Use elimination or substitution to solve simultaneous equations;</li> <li>Solve exactly, by elimination of an unknown, two simultaneous equations in two unknowns:               <ul style="list-style-type: none"> <li>linear / linear, including where both need multiplying;</li> <li>linear / quadratic;</li> <li>linear / <math>x^2 + y^2 = r^2</math>;</li> </ul> </li> <li>Set up and solve a pair of linear simultaneous equations in two variables, including to represent a situation;</li> <li>Interpret the solution in the context of the problem</li> <li>Show inequalities on number lines;</li> <li>Write down whole number values that satisfy an inequality;</li> <li>Solve simple linear inequalities in one variable, and represent the solution set on a number line;</li> <li>Solve two linear inequalities in <math>x</math>, find the solution sets and compare them to see which value of <math>x</math> satisfies both solve linear inequalities in two variables algebraically;</li> <li>Use the correct notation to show inclusive and exclusive inequalities.</li> </ul>	<ul style="list-style-type: none"> <li>Students must know that the quadratic formula can be used to solve all quadratic equations, and often provides a more efficient method than factorising or completing the square.</li> <li>Students should understand solutions that can be written in surd form</li> <li>Remind students to use brackets for negative numbers when using a calculator, and remind them of the importance of knowing when to leave answers in surd form.</li> <li>Link to unit 2, when quadratics were solved algebraically (when <math>a = 1</math>).</li> <li>The quadratic formula must now be known; it will not be given in the exam paper.</li> <li>Reinforce the fact that some problems may produce one inappropriate solution which can be ignored.</li> <li>Clear presentation of working out is essential.</li> <li>Link with graphical representations.</li> <li>Emphasise the importance of leaving their answer as an inequality (and not changing it to =).</li> <li>Link to units 2 and 9a, where quadratics and simultaneous equations were solved.</li> <li>Students can leave their answers in fractional form where appropriate.</li> <li>Ensure that correct language is used to avoid reinforcing misconceptions: for example, 0.15 should never be read as 'zero point fifteen', and <math>5 &gt; 3</math> should be read as 'five is greater than 3', not '5 is bigger than 3'.</li> </ul>
Assumed Prior Knowledge/ Links / Interleaving	
<ul style="list-style-type: none"> <li>Students should understand the <math>\geq</math> and <math>\leq</math> symbols.</li> <li>Students can substitute into, solve and rearrange linear equations.</li> <li>Students should be able to factorise simple quadratic expressions.</li> <li>Students should be able to recognise the equation of a circle.</li> </ul>	

<b>Potential Barriers to Access / Misconceptions</b>		<b>Opportunities for Reasoning/Problem Solving/Proofs</b>	
<ul style="list-style-type: none"> <li>Using the formula involving negatives can result in incorrect answers.</li> <li>If students are using calculators for the quadratic formula, they can come to rely on them and miss the fact that some solutions can be left in surd form.</li> <li>When solving inequalities students often state their final answer as a number quantity, and exclude the inequality or change it to =.</li> <li>Some students believe that -6 is greater than -3.</li> </ul>		<ul style="list-style-type: none"> <li>Problems that require students to set up and solve a pair of simultaneous equations in a real-life context, such as 2 adult tickets and 1 child ticket cost £28, and 1 adult ticket and 3 child tickets cost £34. How much does 1 adult ticket cost?</li> <li>Problems that require student to justify why certain values in a solution can be ignored</li> </ul>	
<b>Key Mathematical Vocabulary</b>	Quadratic, solution, root, linear, solve, simultaneous, inequality, completing the square, factorise, rearrange, surd, function, solve, circle, sets, union, intersection		