

Solving Quadratic Equations

Keywords:	Quadratic Equation / Solution / Formula / Factorise / Discriminant				
Definition / Description:	Quadratic Equation: An equation where the maximum power is two	Solution: The answer to a quadratic equation	Formula: An equation to find quantities when given certain values	Factorise: To break up or to separate into factors	Discriminant: the part of the quadratic formula underneath the square root symbol
Knowledge points:	Solving by factorising – Use the product and sum	Solving when not equal to zero	Solving by completing the square	Solve using the quadratic formula – Use the formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	Finding the amount of solutions a quadratic equation has. The value of the discriminant shows the amount of solutions a quadratic equation has
Knowledge point examples:	<p>Factorise and solve $g^2 + 11g + 24 = 0$</p> <p>Factors of 24</p> <p>1 and 24</p> <p>2 and 12</p> <p>3 and 8</p> <p>4 and 6</p> <p>$g^2 + 11g + 24 \equiv (g + 3)(g + 8)$</p> <p>$(g + 3)(g + 8) = 0$</p> <p>$g = -3$ and $g = -8$</p>	<p>A quadratic equation can only be solved when equal to zero</p> <p>Factorise and solve:</p> <p>$x^2 + 6x + 10 = 2$</p> <p>$x^2 + 6x + 8 = 0$</p> <p>$(x+4)(x+2) = 0$</p> <p>$x = -4$ or -2</p>	<p>Use $\left(x + \frac{b}{2}\right)^2 - \left(\frac{b}{2}\right)^2 + c$</p> <p>To complete the square before solving:</p> <p>$x^2 + 8x + 6 = 0$</p> <p>$(x + 4)^2 - 10 = 0$</p> <p>$(x + 4)^2 = 10$</p> <p>$(x + 4) = \pm\sqrt{10}$</p> <p>$x = \pm\sqrt{10} - 4$</p>	<p>Solve $3x^2 + 8x - 5 = 0$ using the quadratic formula</p> <p>To 3 S.F. $a = 3$ $b = 8$ $c = (-5)$</p> <p>$x = \frac{-8 \pm \sqrt{(64 - 4 \times 3 \times -5)}}{2 \times 3}$</p> <p>$x = \frac{-8 \pm \sqrt{124}}{6}$</p> <p>$x = 0.523$ or $x = -3.19$</p>	<p>$b^2 - 4ac > 0$</p> <p>2 solutions</p> <p>$3x^2 - 4x - 3 = 0$</p> <p>$b^2 - 4ac = (-4)^2 - 4 \times 3 \times (-3) = 52$</p> <p><u>Two Solutions</u></p> <p>$b^2 - 4ac = 0$</p> <p>1 solution</p> <p>$16x^2 + 16x + 4 = 0$</p> <p>$b^2 - 4ac = 16^2 - 4 \times 16 \times 4 = 0$</p> <p><u>One solution</u></p> <p>$b^2 - 4ac < 0$</p> <p>No real solutions</p> <p>$4x^2 + 3x + 2$</p> <p>$b^2 - 4ac = 3^2 - 4 \times 4 \times 2 = -23$</p> <p><u>No real solutions</u></p>
Linked Knowledge Maps	Multiples, Primes, Factors / Notation and manipulation / Non-Linear Graphs quadratic and cubic / Solving Linear Equations / Inequalities / Sequences / Simultaneous equations				