

Topic: Solving Quadratics by Factorising

Topic/Skill	Definition/Tips	Example
1. Quadratic	<p>A quadratic expression is of the form</p> $ax^2 + bx + c$ <p>where a, b and c are numbers, $a \neq 0$</p>	<p>Examples of quadratic expressions:</p> x^2 $8x^2 - 3x + 7$ <p>Examples of non-quadratic expressions:</p> $2x^3 - 5x^2$ $9x - 1$
2. Factorising Quadratics	<p>When a quadratic expression is in the form $x^2 + bx + c$ find the two numbers that add to give b and multiply to give c.</p>	$x^2 + 7x + 10 = (x + 5)(x + 2)$ <p>(because 5 and 2 add to give 7 and multiply to give 10)</p> $x^2 + 2x - 8 = (x + 4)(x - 2)$ <p>(because +4 and -2 add to give +2 and multiply to give -8)</p>
3. Difference of Two Squares	<p>An expression of the form $a^2 - b^2$ can be factorised to give $(a + b)(a - b)$</p>	$x^2 - 25 = (x + 5)(x - 5)$ $16x^2 - 81 = (4x + 9)(4x - 9)$
4. Solving Quadratics ($ax^2 = b$)	<p>Isolate the x^2 term and square root both sides.</p> <p>Remember there will be a positive and a negative solution.</p>	$2x^2 = 98$ $x^2 = 49$ $x = \pm 7$
5. Solving Quadratics ($ax^2 + bx = 0$)	<p>Factorise and then solve = 0.</p>	$x^2 - 3x = 0$ $x(x - 3) = 0$ $x = 0 \text{ or } x = 3$
6. Solving Quadratics by Factorising ($a = 1$)	<p>Factorise the quadratic in the usual way. Solve = 0</p> <p>Make sure the equation = 0 before factorising.</p>	<p>Solve $x^2 + 3x - 10 = 0$</p> <p>Factorise: $(x + 5)(x - 2) = 0$ $x = -5 \text{ or } x = 2$</p>
7. Factorising Quadratics when $a \neq 1$	<p>When a quadratic is in the form</p> $ax^2 + bx + c$ <ol style="list-style-type: none"> Multiply a by $c = ac$ Find two numbers that add to give b and multiply to give ac. Re-write the quadratic, replacing bx with the two numbers you found. Factorise in pairs – you should get the same bracket twice Write your two brackets – one will be the repeated bracket, the other will be made of the factors outside each of the two brackets. 	<p>Factorise $6x^2 + 5x - 4$</p> <ol style="list-style-type: none"> $6 \times -4 = -24$ Two numbers that add to give +5 and multiply to give -24 are +8 and -3 $6x^2 + 8x - 3x - 4$ Factorise in pairs: $2x(3x + 4) - 1(3x + 4)$ Answer = $(3x + 4)(2x - 1)$
8. Solving Quadratics by Factorising ($a \neq 1$)	<p>Factorise the quadratic in the usual way. Solve = 0</p> <p>Make sure the equation = 0 before factorising.</p>	<p>Solve $2x^2 + 7x - 4 = 0$</p> <p>Factorise: $(2x - 1)(x + 4) = 0$ $x = \frac{1}{2} \text{ or } x = -4$</p>