

Examples - Solving Quadratic Equations by using the quadratic formula

Example 1 Solve $x^2 + 6x + 4 = 0$. Give your solutions in surd form.

$a = 1, b = 6, c = 4$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \frac{-6 \pm \sqrt{6^2 - 4(1)(4)}}{2(1)}$ $x = \frac{-6 \pm \sqrt{20}}{2}$ $x = \frac{-6 \pm 2\sqrt{5}}{2}$ $x = -3 \pm \sqrt{5}$ So $x = -3 - \sqrt{5}$ or $x = \sqrt{5} - 3$	1 Identify a, b and c and write down the formula. Remember that $-b \pm \sqrt{b^2 - 4ac}$ is all over $2a$, not just part of it. 2 Substitute $a = 1, b = 6, c = 4$ into the formula. 3 Simplify. The denominator is 2, but this is only because $a = 1$. The denominator will not always be 2. 4 Simplify $\sqrt{20}$. $\sqrt{20} = \sqrt{4 \times 5} = \sqrt{4} \times \sqrt{5} = 2\sqrt{5}$ 5 Simplify by dividing numerator and denominator by 2. 6 Write down both the solutions.
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Example 8 Solve $3x^2 - 7x - 2 = 0$. Give your solutions in surd form.

$a = 3, b = -7, c = -2$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \frac{-(-7) \pm \sqrt{(-7)^2 - 4(3)(-2)}}{2(3)}$ $x = \frac{7 \pm \sqrt{73}}{6}$ So $x = \frac{7 - \sqrt{73}}{6}$ or $x = \frac{7 + \sqrt{73}}{6}$	1 Identify a, b and c, making sure you get the signs right and write down the formula. Remember that $-b \pm \sqrt{b^2 - 4ac}$ is all over $2a$, not just part of it. 2 Substitute $a = 3, b = -7, c = -2$ into the formula. 3 Simplify. The denominator is 6 when $a = 3$. A common mistake is to always write a denominator of 2. 4 Write down both the solutions.
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