Guide to:
Quadratic expressions

maths Links

Explanation:

To expand double brackets **(x + a)(x + b)**, multiply every term in the first bracket by every term in the second bracket and simplify the middle **x** terms. To factorise $x^2 + bx + c$, find two numbers that **multiply to give c** and **add to give b**.

Look out for the **difference of two squares**: $a^2 - b^2 = (a + b)(a - b)$. For harder quadratics $ax^2 + bx + c$ (where a > 1), find two numbers that multiply to **ac** and add to **b**, then split the middle term and factorise in pairs.

Example 1: Factorise (a) $x^2 - 5x - 14$ and (b) $x^2 - 49$.

Solution:

(a) Multiply to **−14** and add to **−5** → **−7** and **+2**

• $x^2 - 5x - 14 = (x - 7)(x + 2)$

(b) Difference of two squares ($x^2 - 7^2$):

• $x^2 - 49 = (x + 7)(x - 7)$

Answer: (a) (x − 7)(x + 2), (b) (x + 7)(x − 7)

Example 2: Factorise $2x^2 + 7x + 3$.

Solution:

Multiply a × c = 2 × 3 = **6**; factors adding to 7 are **6** and **1**

Split middle term: $2x^2 + 6x + x + 3$

Factorise pairs: **2x(x + 3) + 1(x + 3)**

Collect brackets: **(2x + 1)(x + 3)**

Answer: (2x + 1)(x + 3)

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