Guide to:
Triple brackets

maths Links

Explanation:

To expand three brackets **(x + a)(x + b)(x + c)**, break the problem into two clear stages: first expand and simplify **any two of the brackets** into a single quadratic expression **(x^2 + px + q)**.

Next, multiply every term in your simplified quadratic by every term in the third bracket (giving 6 terms before simplifying), then collect like terms in order: **x^3**, **x^2**, **x**, and the number term.

Example 1: Expand and simplify **(x + 3)(x − 2)(x + 5)**.

Solution:

Expand first two: (x + 3)(x − 2) = **x^2 + x − 6**

Multiply by (x + 5): $x(x^2 + x - 6) + 5(x^2 + x - 6)$

$= x^3 + x^2 - 6x + 5x^2 + 5x - 30$

Collect like terms:

Answer: $x^3 + 6x^2 - x - 30$

Example 2: Expand and simplify **(2x − 1)(x + 4)(x − 3)**.

Solution:

Expand last two: (x + 4)(x − 3) = **x^2 + x − 12**

Multiply by (2x − 1): $2x(x^2 + x - 12) - 1(x^2 + x - 12)$

$= 2x^3 + 2x^2 - 24x - x^2 - x + 12$

Collect like terms:

Answer: $2x^3 + x^2 - 25x + 12$

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