

Adding and Multiplying Polynomials

9th Grade

Combine like terms to add; distribute everything to multiply.

To add polynomials, combine like terms. To multiply, every term in the first bracket multiplies every term in the second.

$$(a + b)(c + d) = ac + ad + bc + bd$$

$$(3x^2 + 2x) + (x^2 - 5x)$$

$$4x^2 - 3x$$

Only like terms combine.

$$(x + 3)(x + 4)$$

$$x^2 + 7x + 12$$

FOIL: first, outer, inner, last.

$$(x + 5)^2$$

$$x^2 + 10x + 25$$

Not $x^2 + 25$. The middle term is real.

$$(x + 3)(x - 3)$$

$$x^2 - 9$$

Difference of squares — the middle terms cancel.

THE COMMON MISTAKE

× $(x + 5)^2 = x^2 + 25$

✓ $x^2 + 10x + 25$

Squaring a bracket is multiplying it by itself, which produces a middle term.

FOIL only works for two binomials. For anything bigger, distribute systematically.