

SKILL #25

CODE: PN.2

Adding and subtracting polynomials



Core Concept

To add or subtract polynomials, you combine like terms. Like terms have the same variable(s) and exponent(s).

Why It Matters

You'll use this skill in algebra, geometry, and beyond. It helps you simplify expressions, solve equations, and understand patterns.

Examples

Example 1: Adding

$$(3x^2 + 2x + 1) + (x^2 + 4x + 5)$$

STEP 1: Align like terms:

$$3x^2 + x^2 + 2x + 4x + 1 + 5$$

STEP 2: Combine:

$$4x^2 + 6x + 6 \quad \checkmark$$

Example 2: Subtracting: $(5x^2 + 3x + 2) - (2x^2 + x + 4)$

STEP 1: Distribute the negative:

$$5x^2 + 3x + 2 - 2x^2 - x - 4$$

STEP 2: Align like terms:

$$5x^2 - 2x^2 + 3x - x + 2 - 4$$

STEP 3: Combine:

$$3x^2 + 2x - 2 \quad \checkmark$$

Example 3: Simplify

$$(2x^2 + 3x + 5) + (4x^2 - 5x - 9)$$

STEP 1: Align like terms:

$$2x^2 + 4x^2 + 3x - 5x + 5 - 9$$

STEP 2: Combine:

$$4x^2 - 2x - 4 \quad \checkmark$$

Example 4: Simplify $(5x^2 + x - 7) - (2x^2 - 3x + 4)$

STEP 1: Distribute the negative:

$$5x^2 + x - 7 - 2x^2 + 3x - 4$$

STEP 2: Align like terms:

$$5x^2 - 2x^2 + x + 3x - 7 - 4$$

STEP 3: Combine:

$$3x^2 + 4x - 11 \quad \checkmark$$



Common Mistakes to Avoid

- ✗ Forgetting to combine only like terms
- ✗ Dropping or changing signs when subtracting
- ✗ Not writing polynomials in standard form
(highest degree first)



Additional Resources



Special Case: Simplifying with Fractions

$$\text{Simplify: } \frac{2x^2-7x}{3} - \frac{7x^2+4}{2}$$

STEP 1: Rewrite each fraction with the common denominator --> 6.

$$\frac{2(2x^2-7x)}{6} - \frac{3(7x^2+4)}{6} \rightarrow \frac{4x^2-14x}{6} - \frac{21x^2+12}{6}$$

STEP 2: Distribute the negative and combine the two fractions:

$$\frac{4x^2-21x^2-14x-12}{6} \rightarrow = \frac{-17x^2-14x-12}{6} \quad \checkmark$$