

Polynomial Power Moves

Add, subtract, and multiply expressions with confidence.

HIGH SCHOOL • AI-A.APR.1

AI-A.APR.1 "Add, subtract, and multiply polynomials and recognize that the result of the operation is also a polynomial. This forms a system analogous to the integers."

NAME _____

DATE _____

KEEP IT POLYNOMIAL

When you add or subtract polynomials, combine only like terms. When you multiply polynomials, distribute each term and then combine like terms. These operations produce terms with nonnegative whole-number exponents, so the result is also a polynomial.

WORKED EXAMPLE

Simplify: $(11x^2 - 12x + 14) + (15x^2 + 16x - 17)$

1. Remove the parentheses because the operation is addition.
2. Combine the x^2 terms: $11x^2 + 15x^2 = 26x^2$.
3. Combine the x terms and constants: $-12x + 16x = 4x$, and $14 - 17 = -3$.

Answer: $26x^2 + 4x - 3$

PRACTICE 6 problems

1 Simplify: $(2x^2 + 9x - 4) + (7x^2 - 5x + 6)$

ANSWER _____

2 Simplify: $(10x^3 - 7x + 3) - (4x^3 + 2x - 8)$

ANSWER _____

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

ANSWER _____

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

ANSWER _____

5 Simplify: $(x - 6)(x + 6)$

ANSWER _____

6 Simplify: $(3x^2 + 2x - 7) + (x^2 - 5x + 4) - (2x^2 - x + 9)$

ANSWER _____

APPLY IT Show your work

- 1** A game designer models points earned in two bonus rounds with the polynomials $3x^2 + 4x - 9$ and $5x^2 - 7x + 6$. Write one polynomial for the total points from both rounds.

WORK SPACE

ANSWER _____

- 2** A music club models its projected fundraiser balance by $7x^2 + 3x - 4$. Its event costs are modeled by $2x^2 - 5x + 8$. Write a polynomial for the projected balance after subtracting the costs.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Simplify $(x + 2)(2x - 3)(x - 4)$. Then explain in one sentence why your result is a polynomial.

WORK SPACE AND ANSWER

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Simplify: $(2x^2 + 9x - 4) + (7x^2 - 5x + 6)$	$9x^2 + 4x + 2$
2	Simplify: $(10x^3 - 7x + 3) - (4x^3 + 2x - 8)$	$6x^3 - 9x + 11$
3	Simplify: $-3x(4x^2 - 5x + 2)$	$-12x^3 + 15x^2 - 6x$
4	Simplify: $(2x + 3)(x^2 - 4x + 5)$	$2x^3 - 5x^2 - 2x + 15$
5	Simplify: $(x - 6)(x + 6)$	$x^2 - 36$
6	Simplify: $(3x^2 + 2x - 7) + (x^2 - 5x + 4) - (2x^2 - x + 9)$	$2x^2 - 2x - 12$

PART 2 • APPLY IT

1. **$8x^2 - 3x - 3$** Add the two polynomials and combine like terms. The x^2 terms total $8x^2$, the x terms total $-3x$, and the constants total -3 .
2. **$5x^2 + 8x - 12$** Subtract the entire cost polynomial, then combine like terms. Distributing the subtraction changes each sign in the cost polynomial.

CHALLENGE

$2x^3 - 7x^2 - 10x + 24$. The result is a polynomial because every term has a nonnegative whole-number exponent of x .

Accept equivalent polynomial forms with terms written in a different order. For the challenge explanation, accept any accurate statement that the simplified expression has only terms with nonnegative whole-number exponents.