LESSON MAKER PRO

Polynomial Power Mix

Combine, distribute, and simplify rational coefficients.

HIGH SCHOOL · MA.912.AR.1.3

MA.912.AR.1.3 "Add, subtract and multiply polynomial expressions with rational number coefficients."

NAME _____ DATE _____

COMBINE AND DISTRIBUTE

When you add or subtract polynomials, combine only like terms and simplify each coefficient. When you multiply, distribute every term in one factor to every term in the other factor, then combine like terms.

WORKED EXAMPLE

Simplify: $(7/11x^2 - 5/13x + 7/16) + (4/17x^2 + 4/15x - 5/18)$

1. Group like terms: $(7/11 + 4/17)x^2 + (-5/13 + 4/15)x + (7/16 - 5/18)$.
2. Find the x^2 coefficient: $7/11 + 4/17 = 119/187 + 44/187 = 163/187$.
3. Find the x coefficient: $-5/13 + 4/15 = -75/195 + 52/195 = -23/195$.
4. Find the constant: $7/16 - 5/18 = 63/144 - 40/144 = 23/144$.

Answer: $163/187x^2 - 23/195x + 23/144$

PRACTICE 6 problems

1 Simplify: $(3/4x^2 - 2/5x + 1/3) + (1/4x^2 + 7/5x - 5/6)$

ANSWER _____

2 Simplify: $(5/6x^2 - 3/8x + 2/9) - (1/3x^2 + 1/4x - 5/9)$

ANSWER _____

3 Simplify: $-2/3x(9/10x^2 - 3/4x + 6/7)$

ANSWER _____

4 Simplify: $(1/2x - 3/5)(4/7x + 5/6)$

ANSWER _____

5 Simplify: $(2/3x + 1/4)(3/5x - 2/7)$

ANSWER _____

6 Simplify: $(7/9x^2 + 1/6x - 4/5) - (-2/9x^2 + 5/12x + 3/10)$

ANSWER _____

APPLY IT Show your work

1 For a student-run music festival, x is the number of hundreds of tickets sold. Revenue is modeled by $R(x) = 4/9x^2 + 7/6x + 3/4$, and expenses are modeled by $E(x) = 1/9x^2 - 1/3x + 2/5$, where both amounts are in thousands of dollars. Write and simplify the profit model $P(x) = R(x) - E(x)$.

WORK SPACE

ANSWER _____

2 A skate-park design uses a rectangular practice pad with length $(2/5x + 3/7)$ meters and width $(5/8x - 1/3)$ meters. Write and simplify a polynomial for the area of the pad.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Simplify: $(1/3x^2 - 1/2x + 2/5)(3/4x - 5/6)$

WORK SPACE AND ANSWER

ANSWER KEY

Polynomial Power Mix

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Simplify: $(3/4x^2 - 2/5x + 1/3) + (1/4x^2 + 7/5x - 5/6)$	**$x^2 + x - 1/2$**
2	Simplify: $(5/6x^2 - 3/8x + 2/9) - (1/3x^2 + 1/4x - 5/9)$	**$1/2x^2 - 5/8x + 7/9$**
3	Simplify: $-2/3x(9/10x^2 - 3/4x + 6/7)$	**$-3/5x^3 + 1/2x^2 - 4/7x$**
4	Simplify: $(1/2x - 3/5)(4/7x + 5/6)$	**$2/7x^2 + 31/420x - 1/2$**
5	Simplify: $(2/3x + 1/4)(3/5x - 2/7)$	**$2/5x^2 - 17/420x - 1/14$**
6	Simplify: $(7/9x^2 + 1/6x - 4/5) - (-2/9x^2 + 5/12x + 3/10)$	**$x^2 - 1/4x - 11/10$**

PART 2 · APPLY IT

1. **$P(x) = 1/3x^2 + 3/2x + 7/20$** Subtract the expense polynomial from the revenue polynomial. Distribute the subtraction sign to every term of E(x), then combine like terms.
2. **$1/4x^2 + 113/840x - 1/7$** Multiply the length and width using distribution. Combine the two x terms after multiplying all four pairs of terms.

CHALLENGE

$1/4x^3 - 47/72x^2 + 43/60x - 1/3$

Accept equivalent simplified polynomials with terms written in a different order. For subtraction problems, require that each term in the second polynomial has its sign changed before like terms are combined.