

# Adding and Multiplying Polynomials { 2.1 }

Secondary Math II Notes

**OBJECTIVE:** Correctly simplify polynomials expressions using addition, subtraction, and multiplication. Use the distributive property to multiply binomials, trinomials, and polynomials.

## Simplifying Expressions- Addition and Subtraction

Identify and combine any like terms in the expression below.

$$3x - 2 + 14x - 3x^2 + 4y - 1 + 2y^2 - 4y - 21y^2 + 4x^2 - 12z + 7x$$

$$3x + 14x + 7x = 24x$$

$$-2 + -1 = -3$$

$$-3x^2 + 4x^2 = 1x^2$$

$$4y + -4y = 0$$

$$2y^2 + -21y^2 = -19y^2$$

$$-12z + -12z$$

|   |  |
|---|--|
| <p>A.</p> $2 - 9 + 2x + 3x^2 - 5x + 10 - 1$ $3x^2 - 3x + 2$           | <p>B.</p> $(2x^3 + 2x^2 + 4x + 8) + (6x^3 + 5x^2 - 2x - 7)$ $8x^3 + 7x^2 + 2x + 1$ |
| <p>C.</p> $(x^2 + 3x - 7) - (3x^3 + 2x^2 - 4)$ $-3x^3 - x^2 + 3x - 3$ | <p>D.</p> $(5x^2 - 3x + 4) - (4x^2 - 3x - 11)$ $x^2 + 15$                          |
| <b>Addition</b>   | <b>Multiplication</b>  |
| $3 + x = 3 + x$   | $3 \cdot x = 3x$   |
| $x + x = 2x$  | $x \cdot x = x^2$  |
| $x + x + x = 3x$  | $x \cdot x \cdot x = x^3$  |
| $-x + x = 0$  | $-x \cdot x = -x^2$  |
| $2x + 3x = 5x$  | $2x \cdot 3x = 6x^2$   |
| $7x + x = 8x$   | $7x \cdot x = 7x^2$  |
| $4x + 5y = 4x + 5y$   | $4x \cdot 5y = 20xy$   |
| $2x + x^2 = 2x + x^2$   | $2x \cdot x^2 = 2x^3$  |
| $x + x^2 + x^3 = x + x^2 + x^3$                                       | $x \cdot x^2 \cdot x^3 = x^6$  |
| $3x^2 + 5y^4 = 3x^2 + 5y^4$   | $3x^2 \cdot 5y^4 = 15x^2y^4$ $3x^2 + 5y^4$   |

**Multiplying by a Monomial**

$$2(x+9)$$

$$2x+18$$

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

$$-5x^2-20x+10$$

$$3x(-x-11)$$

$$-3x^2-33x$$

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

$$-2x^4+10x^3-6x^2$$

**Multiplying by a Binomial**

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

$$x^2-3x+2x-6$$

$$x^2-x-6$$

$$(3x+3)(2x+7)$$

$$6x^2+21x+6x+21$$

$$6x^2+27x+21$$

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

$$x^5+4x^4+x^2+4x^4+16x^3+4x$$

$$x^5+8x^4+16x^3+x^2+4x$$

$$(3x+1)(3x-1)$$

$$9x^2+3x-3x-1$$

$$9x^2-1$$

$$(2x+5)(2x+5)$$

$$4x^2+10x+10x+25$$

$$4x^2+20x+25$$

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

$$x^5+x^4+x^4+x^3$$

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

**Multiplying by a Trinomial**

$$(x^2+2x+3)(x^2+5x-6)$$

$$x^4+5x^3-6x^2+2x^3+10x^2-12x+3x^2+15x-18$$

$$x^4+7x^3+7x^2+3x-18$$

$$(x^2+3x-2)(y^2+5y+1)$$

$$x^2y^2+5x^2y+x^2+3xy^2+15xy+3x-2y^2-10y-2$$