

Multiplying Polynomials - Basics

Objective 1: Types of Polynomials

- A **monomial** is polynomial with one term.
 - Examples: $7x^2$, $-3ab$, $-x^3y^2$
- A **binomial** is a polynomial with two terms.
 - Examples: $6x - 7$, $3a^2 + 2b$
- A **trinomial** is a polynomial with three terms.
 - Example: $-3x^2y + 5xy - 2$

Objective 2: Multiply Two Monomials

Procedure: To multiply two monomials,

1. Multiply their coefficients.
2. Use the product rule of exponents to find the exponent of the corresponding variable(s).

Example: Multiply.

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

Example: Multiply.

$$(-2x^2y)(7x^3y^2)$$

Multiply the following:

1. $(-8a^5)(6a^7)$

2. $(-3a^6b^7)(9a^2b^6)$

3. $(-4x^6y^2)(-7x^3y^9)$

Objective 3: Multiply Any Polynomial by a Monomial

Procedure: To multiply a polynomial by a monomial, use the distributive property to multiply the monomial by each term of the polynomial.

Example: Multiply.

$$3x(2x^4 - 6x^3 + 3x^2)$$

Example: Multiply.

$$-2a^2b(4a^3b^2 - 3ab^2)$$

Multiply the following:

1. $3a^4(2a^3 - 4a^2 + 7)$

2. $-4x^3(3x^5 + 6x^2 - 2)$

3. $4m^3n^2(7m^2n^4 - 5m^4n^2)$

Objective 4: Multiply Two Binomials

Procedure: To multiply two binomials, use the distributive property twice or **FOIL**.

First

Outer

Inner

Last

$$(a + b)(c + d)$$

Example: Multiply.

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

Example: Multiply.

$$(3x - 5y)(2x + 7y)$$

Multiply the following:

1. $(x - 7)(x - 8)$

2. $(x - 6)(x + 9)$

3. $(4a - 7b)(5a + 9b)$

Objective 5: Multiply the Sum and Difference of the Same Two Terms

$$(a + b)(a - b) =$$

Example: Multiply.

$$(x + 4)(x - 4)$$

Example: Multiply.

$$(2x + 5y)(2x - 5y)$$

Multiply the following:

1. $(x - 9)(x + 9)$

2. $(3x - 8y)(3x + 8y)$

3. $(5a + 7b)(5a - 7b)$

Objective 6: Squaring a Binomial

$$(a + b)^2 =$$

$$(a - b)^2 =$$

Example: Multiply.

$$(a + 7)^2 =$$

Example: Multiply.

$$(3x - 4)^2 =$$

Multiply the following:

1. $(x - 5)^2$

2. $(3a - 7b)^2$

3. $(4x + 3y)^2$