

## Section P.3 Polynomials and Factoring

**Objective:** In this lesson you learned how to add, subtract, and multiply polynomials and how to factor expressions completely.

Course Number

Instructor

Date

### Important Vocabulary

Define each term or concept.

**Polynomial**

**FOIL Method**

**Factoring**

**Factoring by grouping**

### I. Polynomials (Page 24)

For a polynomial in  $x$ , the degree of a term is . . .

For a polynomial in  $x$ , the degree of the polynomial is . . .

Polynomials with one term are called \_\_\_\_\_.

Polynomials with two terms are called \_\_\_\_\_.

Polynomials with three terms are called \_\_\_\_\_.

In **standard form**, a polynomial in  $x$  is written with . . .

For polynomials in more than one variable, the degree of a term is . . .

For polynomials in more than one variable, the degree of the polynomial is . . .

**Example 1:** Write the polynomial  $1 - 6y - 5y^3 + 4y^2$  in standard form.

#### *What you should learn*

How to write polynomials in standard form

### II. Operations with Polynomials (Pages 25–26)

Like terms are terms that have . . .

#### *What you should learn*

How to add, subtract, and multiply polynomials

To add or subtract polynomials, . . .

To find the product of two polynomials, . . .

**Example 2:** (a) Subtract:  $(5x^3 - 9x + 4) - (2x^3 + 5x^2 - 12x + 4)$   
 (b) Multiply:  $(3x - 2)(x^2 + 2x - 1)$

### III. Special Products (Page 26)

Complete each of the special products below.

#### Sum and Difference of Same Terms

$(u + v)(u - v)$  a \_\_\_\_\_

#### Square of a Binomial

$(u + v)^2$  a \_\_\_\_\_

$(u - v)^2$  a \_\_\_\_\_

#### Cube of a Binomial

$(u + v)^3$  a \_\_\_\_\_

$(u - v)^3$  a \_\_\_\_\_

**Example 3:** Find  $(3x - 4)^2$

### IV. Factoring (Page 27)

If a polynomial cannot be factored using integer coefficients,  
 then it is \_\_\_\_\_ or \_\_\_\_\_.

The simplest type of factoring involves a polynomial that can be  
 written as the product of a monomial and another polynomial.

The technique used here is the Distributive Property in reverse:

$ab + ac =$  \_\_\_\_\_

**Example 4:** Factor  $3w^3 - 12w^2 + 15w$ .

***What you should learn***  
 How to use special  
 products to multiply  
 polynomials

***What you should learn***  
 How to remove common  
 factors from polynomials

**V. Factoring Special Polynomial Forms** (Pages 28–29)

Complete each of the special factoring forms below.

**Difference of Two Squares**

$$u^2 - v^2 \underline{\hspace{10em}}$$

**Perfect Square Trinomial**

$$u^2 + 2uv + v^2 \underline{\hspace{10em}}$$

$$u^2 - 2uv + v^2 \underline{\hspace{10em}}$$

**Sum of Difference of Two Cubes**

$$u^3 + v^3 \underline{\hspace{10em}}$$

$$u^3 - v^3 \underline{\hspace{10em}}$$

To recognize perfect square terms, . . .

To recognize a perfect square trinomial, note that . . .

**Example 5:** Factor:

(a)  $64 - 25y^2$

(b)  $9x^2 + 12xy + 4y^2$

**VI. Trinomials with Binomial Factors** (Page 30)

To factor a trinomial of the form  $ax^2 + bx + c =$

$(\square x + \square)(\square x + \square)$ , the goal is to . . .

**Example 6:** Explain how to factor  $x^2 + 3x - 18$ .

***What you should learn***

How to factor special polynomial forms

***What you should learn***

How to factor trinomials as the product of two binomials

**VII. Factoring by Grouping** (Page 31)

To factor a polynomial with more than three terms by the grouping method, . . .

*What you should learn*  
How to factor by  
grouping

**Example 6:** Factor  $2x^3 + 6x^2 - 3x - 9$  by grouping.

List four guidelines for factoring polynomials:

- 1)
- 2)
- 3)
- 4)

**Additional notes**

**Homework Assignment**

Page(s)

Exercises