

## GUIDED NOTES – 1.5 FACTORING POLYNOMIALS

### LEARNING OBJECTIVES

In this section, you will:

- Factor the greatest common factor of a polynomial.
- Factor a trinomial.
- Factor by grouping.
- Factor a perfect square trinomial.
- Factor a difference of squares.
- Factor the sum and difference of cubes.

### FACTORING THE GREATEST COMMON FACTOR OF A POLYNOMIAL

*Study the box in your textbook section titled “greatest common factor.”*

- The **greatest common factor** (GCF) of polynomials is the largest polynomial that \_\_\_\_\_ evenly into the polynomials.

**Try It:** Read Example 1 in the text, then answer the following.

Factor  $12x^4z^2 - 4x^2z^2 + 24z^2$  by pulling out the GCF.

**Homework:** *You should now be ready to attempt problems 1-2 in “Module 2 Homework” on WeBWork.*

### FACTORING A TRINOMIAL WITH LEADING COEFFICIENT 1

*Study the box in your textbook section titled “factoring a trinomial with leading coefficient 1.”*

- A trinomial in the form  $x^2 + bx + c$  can be written in factored form  $(x + p)(x + q)$  where  $pq = \underline{\hspace{2cm}}$  and  $p + q = \underline{\hspace{2cm}}$ .
- Write out the 3 step procedure for factoring, given a trinomial in the form  $x^2 + bx + c$ .
  - 1.
  - 2.
  - 3.

**Try It:** Read Example 2 in the text, then answer the following.

Factor  $x^2 - 7x + 6$ .

**Homework:** You should now be ready to attempt problems 3-4 in “Module 2 Homework” on WeBWork.

### **FACTORING BY GROUPING**

Study the box in your textbook section titled “factor by grouping.”

- To factor a trinomial in the form  $ax^2 + bx + c$  by grouping, we find two numbers with a product of \_\_\_\_\_ and a sum of \_\_\_\_\_. We use these numbers to divide the  $x$  term into the sum of \_\_\_\_\_ and factor each portion of the expression separately, then factor out the \_\_\_\_\_ of the entire expression.

**Try It:** Read Example 3 in the text, then answer the following.

Factor.

a.  $2x^2 + 9x + 9$

b.  $6x^2 + x - 1$

**Homework:** You should now be ready to attempt problems 5-8 in “Module 2 Homework” on WeBWork.

### **FACTORING A PERFECT SQUARE TRINOMIAL**

Study the box in your textbook section titled “perfect square trinomials.”

- A perfect square trinomial can be written as the square of a binomial.

$$a^2 + 2ab + b^2 = \underline{\hspace{2cm}}$$

**Try It:** Read Example 4 in the text, then answer the following.

Factor  $49x^2 - 14x + 1$ .

## FACTORING A DIFFERENCE OF SQUARES

Study the box in your textbook section titled “difference of squares.”

- A difference of squares can be written as two factors containing the same terms but opposite signs.

$$a^2 - b^2 = \underline{\hspace{2cm}}$$

**Try It:** Read Example 5 in the text, then answer the following.

Factor  $81y^2 - 100$ .

**Homework:** You should now be ready to attempt problems 9-10 in “Homework – Algebra 1.5” on WeBWorK.

## FACTORING THE SUM AND DIFFERENCE OF CUBES

Study the box in your textbook section titled “sum and difference of cubes.”

- We can factor the sum of two cubes as

$$a^3 + b^3 = \underline{\hspace{2cm}}$$

- We can factor the difference of two cubes as

$$a^3 - b^3 = \underline{\hspace{2cm}}$$

**Try It:** Read Example 6 in the text, then answer the following.

Factor the sum of cubes:  $a^3 + 64$ .

**Try It:** Read Example 7 in the text, then answer the following.

Factor the difference of cubes:  $8x^3 - y^3$ .

**Homework:** You should now be ready to attempt problem 11 in “Module 2 Homework” on WeBWorK.



## GUIDED NOTES – 1.6 RATIONAL EXPRESSIONS

### LEARNING OBJECTIVES

In this section, you will:

- Simplify rational expressions.
- Multiply rational expressions.
- Divide rational expressions.
- Add and subtract rational expressions.
- Simplify complex rational expressions.

### SIMPLIFYING RATIONAL EXPRESSIONS

*Try It:* Read Example 1 in the text, then answer the following.

Simplify  $\frac{x^2-2x-48}{x^2-36}$ .

**Homework:** You should now be ready to attempt problem 1 in “Homework – Algebra 1.6” on WeBWorK.

### MULTIPLYING RATIONAL EXPRESSIONS

*Try It:* Read Example 2 in the text, then answer the following.

Multiply the rational expressions and show the product in simplest form.

$$\frac{x^2 + 11x + 30}{x^2 + 5x + 6} \cdot \frac{x^2 + 7x + 12}{x^2 + 8x + 16}$$

**Homework:** You should now be ready to attempt problems 14-16 in “Module 2 Homework” on WeBWorK.

## DIVIDING RATIONAL EXPRESSIONS

- Write out the 5 step procedure for dividing, given two rational expressions.

1.

2.

3.

4.

5.

**Try It:** Read Example 3 in the text, then answer the following.

Divide the rational expressions and show the product in simplest form.

$$\frac{9x^2 - 16}{3x^2 + 17x - 28} \div \frac{3x^2 - 2x - 8}{x^2 + 5x - 14}$$

**Homework:** You should now be ready to attempt problems 17-19 in “Module 2 Homework” on WeBWork.

## ADDING AND SUBTRACTING RATIONAL EXPRESSIONS

- Write out the 5 step procedure for adding or subtracting, given two rational expressions.

1.

2.

3.

4.

5.

*Try It:* Read Examples 4 and 5 in the text, then answer the following.

Subtract the rational expressions:

$$\frac{3}{x+5} - \frac{1}{x-3}$$

**Homework:** You should now be ready to attempt problems 20-22 in “Module 2 Homework” on WeBWork.

## SIMPLIFYING COMPLEX RATIONAL EXPRESSIONS

*Try It:* Read Example 6 in the text, then answer the following.

Simplify:

$$\frac{\frac{x}{y} - \frac{y}{x}}{y}$$

**Homework:** *You should now be ready to attempt problem 23-24 in “Module 2 Homework” on WeBWork.*

### REVIEW QUESTIONS

Answer the following questions in your own words.

4. How can you use factoring to simplify rational expressions?
5. When do you use the LCD to combine two rational expressions?
6. Tell whether the following statement is true or false, and explain why: You need to find the LCD when multiplying rational expressions.