

Factoring Polynomials

In This Unit:

1. GCF's (Greatest Common Factor)
2. $x^2 + bx + c$
3. $ax^2 + bx + c$
4. Special Product Patterns

Bellwork
3/20/12

Divide the polynomials.

1.
$$\frac{-12x^4 + 9x^2 - 27x}{-3x}$$

$$\frac{-12x^4}{-3x^1} + \frac{9x^2}{-3x^1} + \frac{-27x^1}{-3x^1}$$

$$4x^3 - 3x^1 + 9$$

Lesson 12.1 GCF's

What You Need to Know:

A greatest common factor is the product of all the common factors.

To find the GCF of a polynomial, find what each term has in common.

The GCF of $7x^3-63x$ is $7x$.

If the first term of the polynomial (in standard form) is negative, the GCF should be negative because we never want a polynomial that starts with a negative. Boo!

Once you find the GCF, write it outside of the simplified polynomial...like *reverse distribution*.

$7x^3-63x$ simplified is $7x(x^2-9)$

GCF's

Write the polynomial in simplest form by finding the GCF.

$$3w^3 - 75w$$

$$24y^3 + 32y$$

$$3a^2 + 30$$

$$-7t^5 - 14t^4 + 7t^3$$

$$2x^3 + 12x^2 + 18x$$

Homework Assignment

Worksheet "GCF's"

Bellwork

03/21/12

Write the polynomial in simplest form by finding the GCF.

$$1. \quad \frac{-8k^4 + 16k^3 - 64k}{-8k^2} \textcircled{2}$$

$$-8k^2(k^2 - 2k + 8)$$

$$\frac{-8k^4}{-8k^2} + \frac{16k^3}{-8k^2} + \frac{-64k^2}{-8k^2}$$

$$k^2 - 2k + 8$$

Lesson 12.2

Factor x^2+bx+c

What You Need to Know:

Tips for Signs:

x^2+bx+c	$(\ + \) (\ + \)$
x^2-bx+c	$(\ - \) (\ - \)$
x^2+bx-c	$(\ - \) (\ + \)$ or $(\ + \) (\ - \)$
x^2-bx-c	$(\ - \) (\ + \)$ or $(\ + \) (\ - \)$

In Order to Factor:

1. Standard Form?
2. Reduced (Distributive)?
3. Write as a product (Reverse Foil)!

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

How to Factor x^2+bx+c :

1. Factor the first term.
2. Factor the last term.
3. Find factors of the last term that add (or subtract) to give middle term.

$$\underline{x}^2 + \textcircled{4}x + \underline{3}$$

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

$$\begin{array}{r} 3 \\ \underline{1 \overline{) 3}} \\ -3 \\ \hline \end{array}$$

$x^2 + bx + c$

Factor the trinomial.

$$\underline{x^2} + \underline{5x} + \underline{6}$$

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

$$\begin{array}{r} 6 \\ +6 \\ \hline 2 \overline{) 12} \\ 12 \\ \hline 0 \end{array}$$

$$\underline{x^2} + \underline{6x} + \underline{5}$$

$$(x+1)(x+5)$$

$$\begin{array}{r} 5 \\ 1 \overline{) 5} \\ 5 \\ \hline 0 \end{array}$$

$$\underline{x^2} - \underline{7x} + \underline{12}$$

$$(x-3)(x-4)$$

$$\begin{array}{r} 12 \\ 1 \overline{) 12} \\ 12 \\ \hline 0 \\ 2 \overline{) 6} \\ 6 \\ \hline 0 \\ 3 \overline{) 4} \\ 3 \\ \hline 1 \end{array}$$

$$\underline{x^2} - \underline{4x} - \underline{12}$$

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

$$\begin{array}{r} 12 \\ 1 \overline{) 12} \\ 12 \\ \hline 0 \\ 2 \overline{) 6} \\ 6 \\ \hline 0 \\ 3 \overline{) 4} \\ 3 \\ \hline 1 \end{array}$$

$$\underline{x^2} + \underline{3x} - \underline{28}$$

$$(x+7)(x-4)$$

$$7x + (-4)x = 3x \checkmark$$

$$\begin{array}{r} 28 \\ 1 \overline{) 28} \\ 28 \\ \hline 0 \\ 2 \overline{) 14} \\ 14 \\ \hline 0 \\ 4 \overline{) 7} \\ 4 \\ \hline 3 \end{array}$$

$$\underline{x^2} + \underline{15x} + \underline{56}$$

$$(x+7)(x+8)$$

$$7x + 8x = 15x \checkmark$$

$$\begin{array}{r} 56 \\ 1 \overline{) 56} \\ 56 \\ \hline 0 \\ 2 \overline{) 28} \\ 28 \\ \hline 0 \\ 4 \overline{) 14} \\ 14 \\ \hline 0 \\ 7 \overline{) 8} \\ 7 \\ \hline 1 \end{array}$$

Homework Assignment

Worksheet "Factoring x^2+bx+c "

Lesson 12.3

ax^2+bx+c

What You Need to Know:

How to Factor ax^2+bx+c :

1. Simplify if possible.
2. Factor the first term.
2. Factor the last term.
3. Find factors of the first and last term that multiply and add (or subtract) to give the middle term.

$$\underline{3} \quad \quad \quad \underline{6}$$

+11

It's trial and error! When in doubt, try any of the factors!

If the order you choose doesn't work, try this:

1. Switch the signs
2. Switch the order of the numbers
3. Try a different set of factors

$$ax^2 + bx + c$$

Factor the trinomial.

$$5x^2 + 11x + 2$$

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

$$9x^2 + 65x + 14$$

$$6x^2 - 23x + 15$$

$$8x^2 + 38x + 9$$

Homework Assignment

Worksheet "Factoring ax^2+bx+c "

Lesson 12.4

Special Product Patterns

What You Need to Know:

Difference of Two Squares Pattern:
 $a^2 - b^2 = (a+b)(a-b)$

Perfect Square Trinomial Pattern:
 $a^2 + 2ab + b^2 = (a+b)^2$
 $a^2 - 2ab + b^2 = (a-b)^2$

You still need to simplify, if possible!

Special Product Patterns

Factor the expression. Simplify first, if necessary!

$$m^2 - 9$$

$$49q^2 - 81$$

$$12 - 27x^2$$

$$x^2 - 8x + 16$$

$$9y^2 + 60y + 100$$

$$2x^2 - 12x + 18$$

Homework Assignment

Worksheet "Special Product Patterns"

