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

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

$\boxed{4x^3 - 3x^1 + 9}$

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. $-8k^4+16k^3-64k^2$

Lesson 12.2
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)!

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.

$$x^2 + bx + c$$

Factor the trinomial.

$x^2 + 5x + 6$

$x^2 + 6x + 5$

$x^2 - 7x + 12$

$x^2 - 4x - 12$

$x^2 + 3x - 28$

$x^2 + 15x + 56$

Homework Assignment

Worksheet
"Factoring x^2+bx+c"

Bellwork
03/26/12

Factor the polynomial.

1. $4x^4 + 36x^3 + 32x^{\boxed{2}}$

$$4x^2$$

$$\frac{4x^4}{4x^2} + \frac{36x^3}{4x^2} + \frac{32x^2}{4x^2}$$

$$4x^2(1x^2 + 9x + 8)$$

$$4x(x + 1)(x + 8)$$

$$1x + 8x = 9x \checkmark$$

$$\frac{8}{1 \mid 8}$$
$$2 \mid 4$$

Lesson 12.3
ax^2+bx+c

What You Need to Know:

How to Factor ax^2+bx+c:
1. Factor the first term.
2. Factor the last term.
3. Find a combination of the factors of the 1st and last term that multiply and + (or -) to give the middle term.

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.

$5x^2+11x+2$

$\dfrac{5}{1\,|\,5}$ $(1x+2)(5x+1)$ $\dfrac{2}{1\,|\,2}$

$10x+1x=11x$

$2x^2+5x+3$

$(1x+1)(2x+3)$ $\dfrac{3}{1\,|\,3}$

$\dfrac{2}{1\,|\,2}$ $2x+3x=5x\ \checkmark$

$9x^2+65x+14$

$\dfrac{9}{1\,|\,9}$ $(9x+2)(1x+7)$ $\dfrac{14}{1\,|\,14}$ $2\,|\,7$
$3\,|\,3$

$2x+63x=65x\ \checkmark$ $4x$

$6x^2-23x+15$

$\dfrac{6}{1\,|\,6}$ $(6x-5)(1x-3)$ $\dfrac{15}{1\,|\,15}$ $3\,|\,5$ $^{-4x}$
$2\,|\,3$

$-5x+-18x=-23x\ \checkmark$

$8x^2+38x+9$

$\dfrac{8}{1\,|\,8}$ $(2x+9)(4x+1)$ $\dfrac{9}{1\,|\,9}$ $3\,|\,3$
$2\,|\,4$

$36x+2x=38x\ \checkmark$

Homework Assignment

Worksheet
"Factoring ax^2+bx+c"

Bellwork
03/28/12

Write the polynomial in simplest form by finding the GCF.

1. $-8k^4+16k^3-64k^2$

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"