Unit 2: Algebra and Number:

In this unit we will solve problems involving:

Ch 4
- square roots and cube roots
- integral and rational exponents
- irrational numbers, including radicals

Ch 5
- multiplying polynomials
- factoring polynomials

Mar 18-5:58 PM

Chapter 5: Polynomials

5.1 Multiplying Polynomials... But first, just multiplying numbers

Quick! (13)(15) = ? No calculator!!

$(10\times10)+(10\times3)+(10\times5)+(3\times5)$

	10	5
10	$10\cdot10=100$	$10\cdot5$ 50
3	$3\times10=30$	15

$100+50+30+15=195$

Apr 12-7:39 PM

Solve the following using the **area method**:
(x - 3)(2x + 1)

First
Outter
Inner
Last.
FOIL

Method #2: Using the distributive property:

$$(x-3)(2x+1)$$

$$x(2x) + x(1) + (-3)(2x) + (-3)(+1)$$

$$2x^2 + \underbrace{1x + {}^-6x}_{} + {}^-3$$

$$2x^2 - 5x - 3$$

Notice the
similarities?

Apr 12-7:47 PM

We can use the same method when multiplying polynomials.
(x + 3)(x + 1) =

	x	3
x	x^2	$3x$
1	x	3

$$= x^2 + \underbrace{3x + x}_{} + 3$$

$$= x^2 + 4x + 3$$

Apr 12-7:46 PM

Multiply, also called EXPAND + Simplify

$(x - 2y)(x - 4y)$

	x	$-2y$
x	x^2	$-2xy$
$-4y$	$-4xy$	$8y^2$

$x^2 - 2xy - 4xy + 8y^2$

$x^2 - 6xy + 8y^2$

$(x - 2y)(x - 4y)$

$x(x) + x(-4y) + (-2y)(x) + (-2y)(-4y)$

$x^2 + -4xy + -2xy + 8y^2$

$x^2 - 6xy + 8y^2$

Apr 12-7:51 PM

Multiplying a binomial and a trinomial.. Same thing, more terms

$(x + 2)(2x^2 - 5x + 1)$

$x(2x^2) + x(-5x) + x(1) + 2(2x^3) + 2(-5x) + 2(1)$

$2x^3 - 5x^2 + x + 4x^2 - 10x + 2$

$2x^3 - 1x^2 - 9x + 2$

Apr 12-7:52 PM

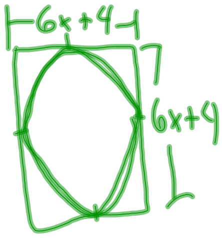
HMWK: Pg 209 #1, 3, 4, 6

yes you can do #6, I believe in you :)

Apr 12-7:53 PM

5.1 Continued: The Word Problems

A circle is inset into a square with a side length of 6x+4. Write an expression to represent the area of the circle. Multiply, then combine like terms.



$A_c = \pi r^2$

$d = 6x+4$

$r = 3x+2$

$A_c = \pi(3x+2)^2$

$A_c = \pi(3x+2)(3x+2)$

$A_c = \pi(9x^2 + 6x + 6x + 4)$

$= \pi(9x^2 + 12x + 4)$

$= 9\pi x^2 + 12\pi x + 4\pi$

Apr 12-8:02 PM

HMWK: Pg 210 # 7, 10, 12, 13, 18

Apr 18-1:01 PM

5.2 Common Factors - GCF and LCM

What is the difference between a **multiple** and a **factor** of a number?

Apr 12-7:55 PM

GREATEST COMMON FACTOR:
is the greatest factor that is common between two or more numbers   Note: these DO NOT HAVE TO BE PRIME NUMBERS

Find the GCF of 84 and 140 using prime factorization

GCF: $2^2 \cdot 7$
$: 4 \cdot 7 = \boxed{28}$

2	84, 140
2	42, 70
7	21, 35
	3, 5

Apr 18-1:04 PM

Find the GCF of 220, 860

2	220, 860
2	110, 430
5	55, 215
	11, 43

GCF $2^2 \cdot 5 = \underline{20}$

Apr 18-1:11 PM

Find the GCF of $220x^2y$ and $860x$

GCF 220, 860 = 20

$$\begin{array}{c|c} x & x^2y,\ x \\ \hline & xy,\ 1 \end{array}$$

GCF $x^2y, x = x$

GCF: $220x^2y, 860x$
$= 20x$

Apr 18-1:11 PM

Factor the polynomial by "removing" the GCF

$27r^2s^2 - 18r^3s^2 - 36rs^3$ $\boxed{GCF = 9rs^2}$

$$\begin{array}{c|c} r & r^2s^2,\ r^3s^2,\ rs^3 \\ \hline s^2 & rs^2,\ r^2s^2,\ s^3 \\ \hline & r,\ r^2,\ s^1 \end{array}$$

GCF: rs^2

$$\begin{array}{c|c} 3 & 27, 18, 36 \\ \hline 3 & 9, 6, 12 \\ \hline & 3, 2, 4 \end{array}$$

GCF = 9

$\boxed{9rs^2(3r - 2r^2 - 4s)}$

Apr 18-1:12 PM

5.~~1~~2 Word Problems and LCM

Find the Lowest Common Multiple of the following two numbers: 30 and 40

$$\begin{array}{r|l} 2 & 30,\ 40 \\ 5 & 15,\ 20 \\ & 3,\ 4 \end{array}$$

GCF $= 2 \cdot 5 = 10$

LCM: $2 \cdot 5 \cdot 3 \cdot 4 = 120$

Apr 18-1:17 PM

Determine least common multiple of 15, 32, 44~~0~~

When prime factorizing 3 or more numbers the prime factor only has to divide TWO of the numbers... the third one just gets pulled down as follows...

$$\begin{array}{r|l} 2 & 15,\ 32,\ 44 \\ 2 & 15,\ 16,\ 22 \\ & 15,\ 8,\ 11 \end{array}$$

$2 \times 2 \times 15 \times 8 \times 11 = 5280$

Apr 18-1:19 PM

HMWK: Pg 220 #2, 3, 4-7, 11, 12

Apr 18-1:14 PM

What is the side length of the smallest square that could be tiled with rectangles that measure 16 cm by 40 cm? Assume the rectangles cannot be cut.

Lowest Common Multiple of 16, 40.

tiles

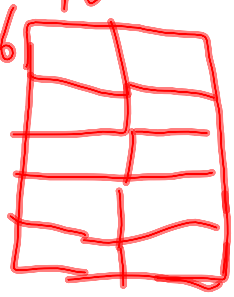
16cm

40cm

room:

40

16



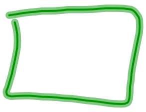
$$
\begin{array}{r|l}
2 & 16, 40 \\
2 & 8, 20 \\
2 & 4, 10 \\
 & 2, 5
\end{array}
$$

$2 \cdot 2 \cdot 2 \cdot 2 \cdot 5 = 80$

Apr 18-1:20 PM

Greatest Common Factor

What is the side length of the largest square that could be used to tile a rectangle that measure 16 cm by 40 cm? Assume the squares cannot be cut.

tile: 

room: 

2 | 16, 40

2 | 8, 20

2 | 4, 10

2, 5

GCF = 8

Apr 18-1:20 PM

HMWK: Pg 220 #8, 13, 15, 16

Apr 18-1:21 PM

5.3 Factoring Trinomials

(This is the crazy part)

RECALL:

Expand → $3(2 - 5a) = 6 - 15a$

Factor → $\frac{6}{3} - \frac{15a}{3} = 3(2 - 5a)$

factoring and expanding are inverse processes

Apr 18-1:23 PM

Factoring in the form $x^2 + bx + c$

b & c are #s

Let's look again at the area and distributive property methods for multiplying binomials...

Consider: How do we form the "b" value and the "c" value in the polynomial?

Multiply: (x+5)(x+3)

$(x+5)(x+3)$

$x(x) + x(3) + 5(x) + 5(3)$

$x^2 + 3x + 5x + 15$

$x^2 + 8x + 15$

$x^2 + bx + c$

Apr 18-1:30 PM

Since factoring and expanding are inverse processes,

we know we will end up with (x + an integer)(x + an integer) when we factor a polynomial in the form $x^2 + bx + c$

We also know by exploring the expanding process that the two integers in the binomial will **add up to** the **"b"** value and **multiply** to get the **"c"** value.

Apr 18-1:31 PM

Let's try it!

Start by looking at "c"

Factor the following trinomial:

$x^2 - 8x + 7$

We we will need factors of + 7 that have a sum of -8.

$7 \times 1 = 7$

$7 + 1 = 8$

$(-7)(-1) = 7$

$(-7) + (-1) = -8$

$$\boxed{(x - 7)(x - 1)}$$

$x^2 + (-1)x + (-7)x + 7$

$x^2 - 8x + 7$

Apr 18-1:31 PM

Factor the trinomial ----watch out for the negative sign!

$a^2 + 7a - 18$

$-2 \times 9 = -18$

$-2 + 9 = +7$

$(a+9)(a-2)$

$a^2 - 2a + 9a - 18$

$a^2 + 7a - 18$

Apr 18-1:32 PM

HMWK: SOLARO ASSIGNMENT

Factoring in form x^2+bx+c

Apr 18-1:33 PM

Factor: $-5x^2 - 20x + 60$

And remember no panicking - you can do this what we learned so far

Apr 18-1:41 PM

More Factoring in the form $x^2 + bx + c$

Factoring worksheet - yay!

Note: NOT all trinomials are factorable! If our conditions can't be met then it can't be factored.

Apr 18-1:50 PM

5.3 Factoring in the form $ax^2 + bx + c$

First things first though... expand and simplify this:

$$(2x + 8)(3x + 7)$$

Apr 18-1:43 PM

Now, nice and slow, let's factor the trinomial

Remember: Factoring and expanding are inverse processes!

$4x^2 + 20x + 9$

Factors of 9:

$(2x+9)(2x+1)$

factor of 9

factors of 4:
$4\times1=4$
$2\times2=4$

$1\times9=9$
$3\times3=9$

$4x^2+2x+18x+9$

$4x^2+20x+9$

$(2)(1)+(2)(9)=20$

$2+18=20$ ✓

Apr 18-5:44 PM

Factor: $3x^2 + 8x + 4$

$(3x+2)(1x+2)$

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

factors of 3

$3 \times 1 = 3$

factors of 4:

$4 \times 1 = 4$

$2 \times 2 = 4$

$3(2) + 1(2)$

$6 + 2 = 8$ ✓

Apr 18-5:53 PM

Factor: $24x^2 - 30x - 9$

GCF factor 3

$3(8x^2 - 10x - 3)$

$3(4x+1)(2x-3)$

Factors -3:

$(-3)(1) = -3$

$(3)(-1) = -3$

Factors 8:

$(8)(1) = 8$

$(4)(2) = 8$

$3(8x^2 - 12x + 2x - 3)$

$3(8x^2 - 10x - 3)$

$24x^2 - 30x - 9$

$4(3) + 2(-1) = 12 - 2 = 10$

$4(-3) + 2(1) = -12 + 2$

$= -10$ ✓

Apr 18-5:56 PM

HMWK: FACTORING WORKSHEET #2

Apr 18-5:57 PM

5.3 Factoring in the form $ax^2 + bx + c$

WORK BLOCK --- Textbook Pg 236 #15, 16 (word problems)

--- Worksheet from last class

Apr 18-6:07 PM

5.4 Factoring Special Trinomials

Difference of Squares: $u^2 - v^2$

A square term minus another square term.

Perfect Square Trinomial: $x^2 + 2\sqrt{c} + c$, where c is a perfect square

Apr 18-6:09 PM

Difference of Squares -- easily recognized for having only 2 terms, both being squares

$x^2 - 9$

$16c^2 + 25a^2$

Apr 18-6:20 PM

Perfect Square Trinomial: $x^2 + 2\sqrt{c} + c$, where c is also a perfect square

$$x^2 + 6x + 9$$

Apr 18-6:31 PM

HMWK: Pg 246 #4, 5-6aceg, 8, 13, 14, 15

Apr 18-6:33 PM

Factoring Review

Apr 18-6:39 PM

Ch 5 Review

Apr 18-6:41 PM

Ch 5 Review

Apr 18-6:41 PM

Ch 5 Review

Apr 18-6:41 PM