Math-2

Lesson 2-8

Factoring Out Common Factors

And

Multiplying Simple Trinomials

Terms The individual numbers in an expression or an expression or equation that are separated by either a "+" or "-" symbol.

$4x$ — 1 term — "Monomial"

$x + 3$ — 2 terms — "Binomial"

$2x^2 + 3x - 4$ — 3 terms — "Trinomial"

$x^3 - 5x^2 + x - 1$ — More than 3 terms? — "Polynomial"

Factor (noun) a number (or expression) that is being multiplied by another number (or expression).

$2x$ Factors: 2, x.

$2(x+3)$ Factors: 2, (x + 3).

Why is (x + 3) a factor? (it looks like a sum)

Because it is an expression that is being multiplied by ‘2’.

$$2 * (x + 3)$$

To Factor (verb) to break a number or an expression into two (or more) parts (factors) that are multiplied together.

$10 \rightarrow 2*5$

Common Factor (noun) a number that is a factor of more than one term in an expression.

The expression 2x + 6 has the common factor '2' in both terms

We can see this if we factor each term individually:

$$2x + 6 \rightarrow (\underline{2}*x) + (\underline{2}*3)$$

"Factoring out" a common Factor from an expression means to rewrite the expression as the *common factor multiplied by* the expression.

$$2x + 6 \rightarrow 2(x + 3)$$

"Factoring out the common factor" is actually the reverse of the distributive property!

distributive property: an expression of terms being added that is multiplied by another number or expression.

$$2(x + 3) \quad = \quad 2x + 6$$

Factoring out the common factor: the "reverse" of the distributive property.

Identify the factors in each expression.

$$5x(3x+1)(2x-5) \rightarrow x^2, (x-2), (x+3)$$

$$x^2(x-2)(x+3) \rightarrow 5, x, (3x+1), (2x-5)$$

Factors can be an expression made up of terms being added.

Sometimes the common factor is an integer

By factoring each term individually it might help you to see what the common factors are.

$$3x - 12$$

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

$$3(x - 4)$$

$$-4x^2 + 8x + 12$$

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

$$-4(x^2 - 2x - 3)$$

Sometimes the common factor is a variable

$$x^2 + x$$

$$(x * x) + (1 * x)$$

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

$$(x * x^2) + (x * x) + x * 1$$

“x” is a common factor both terms

$$x(x + 1)$$

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

Sometimes the common factors are both an **integer** and a **variable.**

$$4x^2 - 16x$$

$$(4 * x * x) - (4 * 4 * x)$$

$$4x(x - 4)$$

$$5x^3 + 15x^2 + 10x$$

$$(5 * x * x * x) + (3 * 5 * x * x) + (2 * 5 * x)$$

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

Factor the following expressions

$$-50b + 90$$

$$-10 + 20n^3$$

$$-60x^5 - 100x^4 - 30x^2$$

$$-81r - 63r^3 - 63r^4$$

$$-24x^4 + 40x^3 - 80x^2 + 16x$$

$$-40x^6 + 20x^2 + 4x + 8$$

Multiplying Binomials

The "Box Method"

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

$x^2 + x - 12$

	x	4
x	x^2	4x
-3	-3x	-12

Standard Form
Quadratic Expression

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

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

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

Multiplying Binomials $(x-4)(2x-3)$

The "Box Method"

	x	-4
2x		
-3		

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

$(6x-2)(x-4)$

$(x-5)(x+5)$
