

Warm Up (1/16/18)

Fill in the following X-boxes:

$$\begin{array}{c}
 \diagdown \quad \diagup \\
 \quad -25 \\
 \underline{5} \quad \times \quad \underline{-5} \\
 \quad \quad \quad + \\
 \quad \quad \quad 0 \\
 \diagup \quad \diagdown
 \end{array}$$

$$\begin{array}{c}
 \diagdown \quad \diagup \\
 \quad 16 \\
 \underline{4} \quad \quad \quad \underline{4} \\
 \quad \quad \quad \quad \quad + \\
 \quad \quad \quad \quad \quad 8 \\
 \diagup \quad \diagdown
 \end{array}$$

Module 4: Lessons 1 and 2

Multiplying and Factoring Polynomial Expressions

Factoring by the GCF

When factoring a polynomial we look for the term with the GCF of all of the terms. We then "reverse" the distribution and write the GCF outside a set of parenthesis.

Ex: Factor the following polynomial expression by using the GCF.

$$\begin{array}{ccc}
 \cancel{3}a^2 & \underline{3a^2} + \underline{3a} & \cancel{3}a = a \\
 \cancel{3} & & \cancel{3} \\
 \frac{a^2}{a} = a & 3(a^2 + a) & \\
 & 3(a \cdot a + a) & \frac{a}{a} = 1 \\
 & \boxed{3a(a+1)} &
 \end{array}$$

Factoring by the GCF

Examples:

$$1. \underline{10ab} + \underline{10a}$$

$$10a(b+1)$$

$$2. \underline{36x^2} + \underline{18x}$$

$$x(36x+18)$$

$$18x(2x+1)$$

$$3. \underline{3g^3h} - \underline{9g^2h} + \underline{12h}$$

$$3(g^3h - 3g^2h + 4h)$$

$$3h(g^3 - g^2 + 4)$$

$$4. \underline{6x^2y^3} + \underline{9xy^4} + \underline{18y^5}$$

$$3(2x^2y^3 + 3xy^4 + 6y^5)$$

$$3y^3(2x^2 + 3xy + 6y^2)$$

Warm Up (1/17/18)

1. Fill in the following X-boxes:

$$\begin{array}{c}
 24 \\
 \begin{array}{cc}
 \textcircled{x} & \\
 \textcircled{+} & \\
 \end{array} \\
 -25
 \end{array}
 \begin{array}{cc}
 \underline{-1} & \underline{-24}
 \end{array}$$

$$\begin{array}{c}
 -42 \\
 \\
 1
 \end{array}
 \begin{array}{cc}
 \underline{-6} & \underline{7}
 \end{array}$$

2. Factor by the GCF:

$$\underline{16}x^2y^3 - \underline{4}x^3y^2$$

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

Vocabulary Relating to Polynomials

Term - a single number or variable, or a combination of the two, that is separated by addition or subtraction

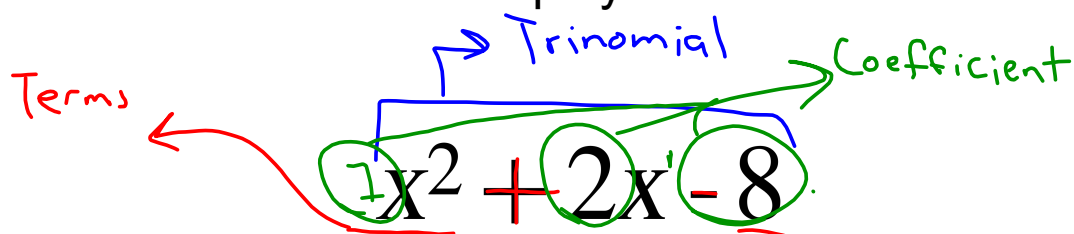
Polynomial - an expression of algebraic terms

Coefficient - a multiplier or a factor of a term

Monomial - a one-term polynomial

Binomial - a two-term polynomial

Trinomial - a three-term polynomial



Multiplying Polynomials

Find the product of $(x + 2)(x + 5)$.

Method 1: Using a Table

	x	$+2$
x	x^2	$2x$
$+5$	$5x$	10

$x^2 + 2x + 5x + 10$
 $x^2 + 7x + 10$

1. We set up a table based on how many terms we are multiplying and label the edges.

2. Fill in the box by multiplying each intersecting term. Remember to keep track of your negatives!

3. Rewrite the individual terms from the box below. Remember to combine like terms.

Method 2: Without a table (FOIL)

For this method we multiply each term individually. We will keep track of our progress as we continue.

F: First terms
 O: Outer terms
 I: Inner terms
 L: Last terms

$$(x + 2)(x + 5) = x^2 + 5x + 2x + 10$$

$x^2 + 7x + 10$

Try these Examples Together

FOIL

1. $(x + 4)(x + 7)$

$$x^2 + 7x + 4x + 28$$

FOIL

2. $(x + 2)(x - 2)$

$$x^2 + 11x + 28$$

$$x^2 - 2x + 2x - 4 = x^2 - 4$$

Box

3. $(x + 6)(x - 6)$

	x	$+6$
x	x^2	$6x$
-6	$-6x$	-36

$$x^2 + 6x - 6x - 36 = x^2 - 36$$

Special Cases

Square of a Binomial

$$x \cdot 4 \cdot 2 \quad (a + b)^2 = a^2 + 2ab + b^2$$

$$(x + 4)^2 = x^2 + 8x + 16$$

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

Difference of Squares

$$(a + b)(a - b) = a^2 - b^2$$

Special Cases - Examples

$$\begin{aligned}
 1. \quad (x + 4)^2 &= a^2 + 2ab + b^2 \\
 a = x \quad b = 4 &= x^2 + 2(x)(4) + (4)^2 \\
 &= x^2 + 8x + 16
 \end{aligned}$$

$$\begin{aligned}
 2. \quad (x - 7)^2 &= x^2 + 2(x)(-7) + (-7)^2 \\
 a = x \quad b = -7 &= x^2 - 14x + 49
 \end{aligned}$$

$$\begin{aligned}
 3. \quad (x + 12)(x - 12) & \text{ Diff. of Squares} \\
 a = x \quad b = 12 & a^2 - b^2 \\
 & x^2 - 144
 \end{aligned}$$

