What's Going On?

Checking In   Homework Logs

Minds on   Factor Sort

Action!   Factor Everything

Consolidation   Factor Sort Part II

Learning Goal - I will be able to factor, like a boss!

F.F.M.

This goes with yesterday's learning goal!

Expand.

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

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

$$= (x - 1)(x^2 + 8x + 16)$$

$$= x^3 + 8x^2 + 16x - x^2 - 8x - 16$$

$$= x^3 + 7x^2 + 8x - 16$$

Minds on

Factor Sort!

With two other people (in a group of 3), choose one of the back tables that has an envelope on it.

When I say GO, sort them into as many groups as you see fit.

Action!

Factoring

Factor.

$$8x^3 - 6x^2y^2 + 4x^2y$$

$$= 2x^2\left(4x - 3y^2 + 2y\right)$$

Determine what **every** term has in common.

<u>Monomial Common Factor</u>

To factor any polynomial:

1. Find the greatest common factor (GCF) of the coefficients.

2. Find the GCF of the variable factors.

3. "Factor out" the monomial common factor.

4. Possibly, keep factoring!

Factoring

Action!

Factor.

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

$$= (z + 1)(2x + 3y)$$

<u>**Binomial Common Factor**</u>

To binomial common factor:

1. Identify the binomial that is common to both portions of the polynomial. This is the **binomial common factor**.

2. Form a binomial consisting of the terms being multiplied by this **binomial common factor**.

3. Multiply your new binomial and the **binomial common factor** together.

Factoring

Action!

Factor.

$2m^2 - 3t - 6m + mt$

$= 2m^2 - 6m \,\vdots\, -3t + mt$

$= 2m(m-3) + t(-3+m)$

$= 2m(m-3) + t(m-3)$

$= (m-3)(2m+t)$

Factoring by Grouping

*Used when we have more than 3 terms.

To factor by grouping:

1. Group terms that have a *common factor*.

2. *Common Monomial Factor* each pair of terms.

3. Look for a *Binomial Common Factor* and factor the polynomial as outlined on the previous slide.

Action!

Factor It!

$$\text{"} x^2 + bx + c \text{"}$$

$x^2 + 9x + 20$	$y^2 + y - 6$	$z^2 - 6z + 9$
Find two numbers that add to give 9 and multiply to give 20.	Find two numbers that add to give 1 and multiply to give -6.	Find two numbers that add to give -6 and multiply to give 9.
$+4 \quad +5$	$+3 \quad -2$	$-3 \quad -3$
$(x + 4)(x + 5)$	$(y + 3)(y - 2)$	$(z - 3)(z - 3)$
		$(z - 3)^2$

Action! Factor It!

Simple Quadratics

$z^2 - 3z - 10$

$-5 + 2$

Find two numbers that
add to give -3 and
multiply to give -10.

$(z-5)(z+2)$
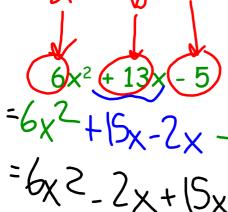
To factor polynomials in the form
$ax^2 + bx + c$ when a = 1:

1. Find two numbers that multiply to
c and add to b.

2. These are your factors.

3. Put them in two sets of brackets
as shown.

Factor It!

Action!

$$\overset{a}{6x^2} + \overset{b}{13x} \overset{c}{- 5}$$

$$= 6x^2 + 15x - 2x - 5$$

$$= 6x^2 - 2x + 15x - 5$$

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

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

<u>Complex Trinomials</u>

To factor polynomials in the form $ax^2 + bx + c$ when $a \neq 1$:

1. Find two numbers that add to b and multiply to (a)(c). (Is this new?)

2. Break up the middle term.

3. Factor by grouping.

Action!

Factor It!

$x \cdot x$

Difference of Squares!

$2 \cdot 2$

$x^2 - 4$

$= x^2 + 0x - 4$

$= (x+2)(x-2)$

$\sqrt{100p^2} - \sqrt{121q^2}$

$= \left(10_p + 11_q\right)\left(10_p - 11_q\right)$

$9x^2 - 16$

$= 9x^2 + 0x - 16$

$= 9x^2 + 12x - 12x - 16$

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

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

$g^4 - 16$

$= (g^2 - 4)(g^2 + 4)$

$= (g+2)(g-2)(g^2+4)$

If you have two terms that are being SUBTRACTED! If both terms are PERFECT SQUARES

1. take the square root of each

2. Add them and subtract them

$\sqrt{x^2} - \sqrt{4}$

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

Action! Factor It!

Perfect Square Trinomials

$2x$ 5

$4x^2 + 20x + 25$

$9x^2 - 24x + 16$

$= 4x^2 + 10x + 10x + 25$

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

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

$= (2x+5)^2$

We will finish the following examples tomorrow!

Consolidation

This is how we factor

Always common factor first!

*You may need to expand before you can factor... paradoxical?

Consolidation

This is how we factor

Factor.

$4x^3 - 6x^2 + 2x$

Consolidation

This is how we factor

Factor.

$7x^2(x + 1) - x(x + 1) + 6(x + 1)$

Consolidation

This is how we factor

Factor.

$5x(2 - x) + 4x(2x - 5) - (3x - 4)$

Consolidation

This is how we factor

Factor.

$4t(t^2 + 4t + 2) - 2t(3t^2 - 6t + 17)$

Consolidation

Factor Re-Sort

Revisit your sorting from the beginning of the lesson.

Now, use the headings to sort them by TYPE.

Common Factor

Simple Trinomial

Complex Trinomial

Perfect Square Trinomial

Difference of Squares

Grouping

Consolidation

Homework!

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