What's Going On?

Checking In

Minds on Peer Review

Action! I'm Special!

Consolidation Practice Test

Learning Goal - I will be able to factor special quadratics.

Consolidation from yesterday

That little guy?
I wouldn't worry about that little guy.

Factor $4x^2 - 5xy - 6y^2$.

1. Common factor? No.

2. Find two integers that sum to -5 and multiply to -24 so we can break up the middle term.

$3x - 8 = -24$
$3 + (-8) = -5$

Break $-5xy$ into $3xy$ and $-8xy$

3. Rewrite the original trinomial with the middle term broken up.

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

switch the order to get better common factors

4. Factor by grouping and rearrange if necessary.

$4x^2 - 8xy + 3xy - 6y^2$
$= 4x(x - 2y) + 3y(x - 2y)$

BCF

5. Binomial Common Factor.

$= (x - 2y)(4x + 3y)$

Minds on

Peer Review I

Factor if possible.

$2m^2 - 4mn - 6n^2$

Minds on

Peer Review II

Factor if possible.

$-12x^2 + 40xy - 32y^2$

Action!

I'm Special!

Factor

$9x^2 - 16$ → $9x^2 + 0x - 16$

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

We need two numbers that sum to 0 and multiply to -144 ... (9)(-16)

12 and -12!

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

B C F

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

There's got to be a better way!!!

Action!

There is!!

Factor

$9x^2 - 16$

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

The only difference is the negative sign!

$a = 3x$

$a^2 = 9x^2$

$b = 4$

$b^2 = 16$

This looks familiar...doesn't it?

$(3x + 4)(3x - 4) = 9x^2 - 16$

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

Action!

Factor $9x^2 - 16$

a^2 b^2

If $a^2 = 9x^2$, $a = 3x$

If $b^2 = 16$, $b = 4$

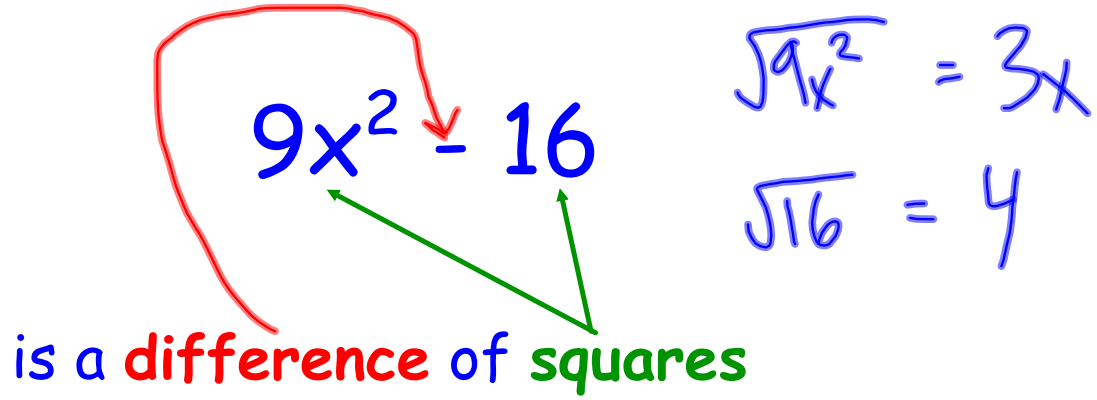
$= (3x + 4)(3x - 4)$

a b a b

different signs!

Action!

Difference of Squares



To factor a difference of difference of squares

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

Action!

Difference of Squares

To factor a difference of difference of squares

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

Factor

$100p^2 - 121q^2$

$\sqrt{100p^2} = 10p \rightarrow a$

$\sqrt{121q^2} = 11q \rightarrow b$

$= (10p + 11q)(10p - 11q)$

Action!

I'm Special Too!

Factor

$4x^2 + 20x + 25$

We need two numbers that sum to 20 and multiply to 100 ... (4)(25)

10 and 10!

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

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

BCF

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

$= (2x+5)^2$

There's got to be a better way!

Action!

I'm Special Too!

Factor

$\sqrt{4x^2} + 20x + \sqrt{25} = (2x+5)(2x+5)$

The square root of $4x^2$ is $2x$

The square root of 25 is 5

$2(2x)(5) = 20x$

This looks familiar too!

What if we took the square root of them?

Notice that the first and last term are ***perfect squares!***

Action!

That's because it is!

Factor

$4x^2 + 20x + 25$

$a^2 + 2ab + b^2$

Perfect Square Trinomial

Where a is $2x$ ($\sqrt{4x^2}$) and b is 5 ($\sqrt{25}$)!

To factor a perfect square trinomial.

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

Action!

Factor It

To factor a perfect square trinomial.

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

Factor

$16x^2 + 40x + 25$

$= (4x + 5)^2$

- are $16x^2$ and 25 perfect squares?

$\sqrt{16x^2} = 4x$ ✓

$\sqrt{25} = 5$ ✓

- is $40x$ equal to $2(4x)(5)$

$= 40x$ ✓

Action!

What About Me?

Factor

$9x^2 - 24x + 16$

We need two numbers that sum to -24 and multiply to 144 ... (9)(16)

-12 and -12!

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

$= 3x(3x-4) - 4(3x-5)$

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

$= (3x-4)^2$

There's got to be a better way!

Action!

What About Me?

Factor

$\sqrt{9x^2} - 24x + \sqrt{16}$

The square root of $9x^2$ is $3x$
The square root of 16 is 4

$-2(3x)(4) = -24x$

This looks familiar too!

negative!

What if we took the square root of them?

Notice that the first and last term are ***perfect squares AGAIN!***

Action!

That's because it is!

Factor

$9x^2 - 24x + 16$

$a^2 - 2ab + b^2$

Perfect Square Trinomial

with a negative middle term

Where a is $3x$ ($\sqrt{9x^2}$) and b is 4 ($\sqrt{16}$)!

To factor a perfect square trinomial
with a negative middle term.

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

Action!

Factor It

To factor a perfect square trinomial
with a negative middle term.

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

Factor

$9x^2 - 24x + 16$

$=(3x-4)^2$

$\sqrt{9x^2} = 3x$

$\sqrt{16} = 4$

Is $-24x$ equal to

$-2(3x)(4)$

$= -24x$ ✓

Action!

Factor It

To factor a perfect square trinomial
with a negative middle term.

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

Factor

$25x^2 - 30xy + 9y^2$ — negative sign

PERFECT SQUARE **PERFECT SQUARE**

$\sqrt{25x^2} = 5x$

$\sqrt{9y^2} = 3y$

does $-30xy$ equal $-2(5x)(3y)$

$-2(5x)(3y) = -30xy$ ✓

So $25x^2 - 30xy + 9y^2$ when factored is

$$(5x - 3y)^2$$

Consolidation

Summary Slide

$a^2 - b^2$

To factor a **difference of squares**:

1. Identify that both terms in your binomial are perfect squares.
2. Take the square root of each term.
3. Label the square roots as a and b.
4. Factor $a^2 - b^2$ as $(a + b)(a - b)$.

$a^2 \pm 2ab + b^2$

To factor a **perfect square trinomial**:

1. Identify that the first and last term are perfect squares.
2. Take the square root of the first and last term.
3. Label the square roots as a and b.
4. Verify that the middle term is equal to $\pm$ 2ab.
5. Factor $a^2 \pm 2ab + b^2$ as $(a \pm b)^2$.

AS ALWAYS, COMMON FACTOR FIRST IF POSSIBLE

A Specialer Case

Factor $x^4 - 16$

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

this can still be factored (difference of squares again)

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

We only have two terms! Is this a difference of squares?

There is a negative sign between the two terms, so it might be!

Are both terms perfect squares?

$\sqrt{x^4} = x^2$ **perfect square!**

$\sqrt{16} = 4$ **perfect square!**

So it is a difference of squares!

a is x^2

b is 4

Consolidation

Homework

WRITE IN YOUR LOG

Pg. 167

1-3 (a, b, c, j, k, l)

6 (ALL)

PRACTICE TEST

Consolidation

That's It!!

That's the end of this unit.

You know everything!

Now, you need to practice it!