Algebra 2 - Unit 2.5

Solving Equations using "Difference of Squares" Factoring

In Unit 1 Lesson 3 we covered Differences of Squares. Here are some bits from that lesson.

Difference of Squares:

Any quantity that can be expressed as a difference of two squares can be factored using the formula...

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

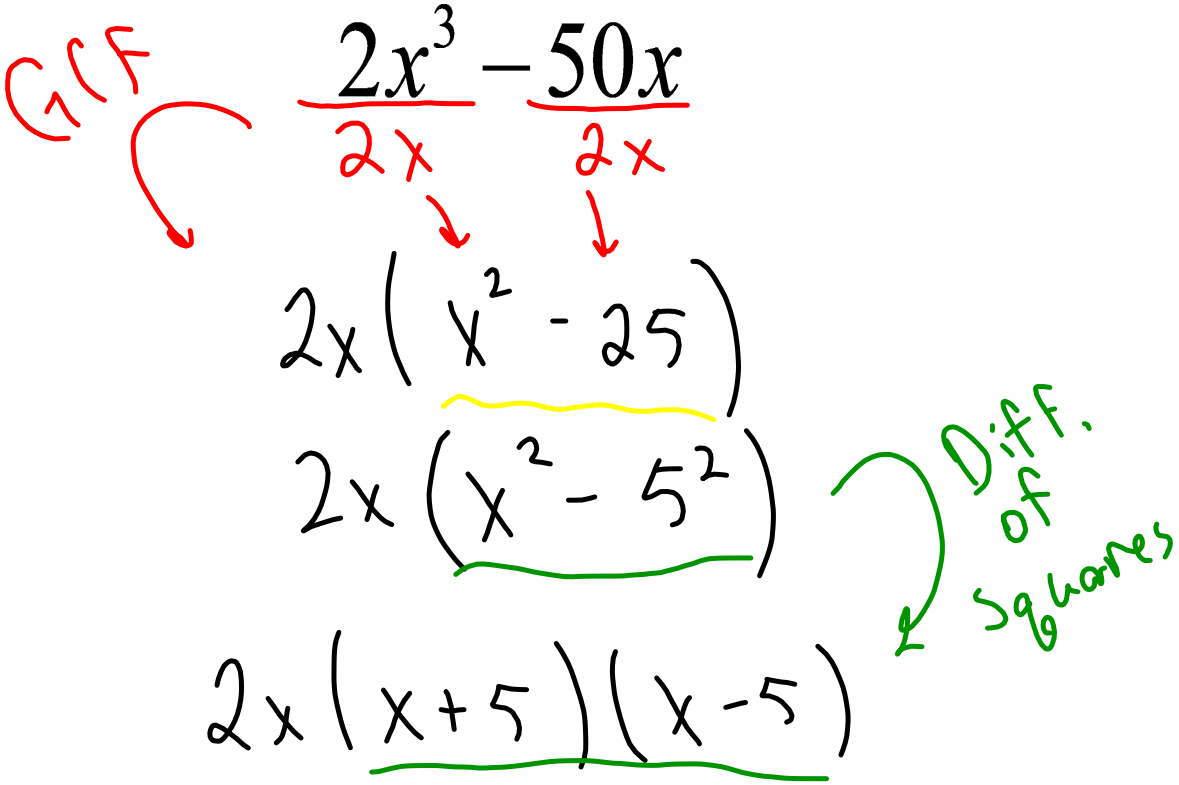
Example: Factor $x^2 - 4$

$$x^2 - 2^2$$

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

This was a more advanced example from that lesson.

Example: Factor out GCF, then Factor using Difference of Squares.



Today we will be solving equations using this method of factoring.

Steps to solve:

1. Get the equation equal to 0 by moving everything to one side.
2. Factor out the GCF (If needed)
3. Factor using Differences of Squares
4. Set Each Factor equal to 0 and solve them both.

Example: Solve the equation

$$2x^3 = 50x$$

Step 1: $-50x \quad -50x$

$$2x^3 - 50x = 0$$

Step 2: GCF : $2x$

$$2x(x^2 - 25) = 0$$

Step 3: Diff of Squares

$$2x(x^2 - 5^2) = 0$$

$$2x(x+5)(x-5) = 0$$

Step 4: Set $= 0$ & solve

$\frac{2x}{2} = \frac{0}{2}$ $\quad x+5=0$ $\quad x-5=0$

$-5 \quad -5$ $\quad +5 \quad +5$

$x=0 \qquad x=-5 \qquad x=5$

Solving using Differences of Squares vs. Square Roots.

Take a look at this example. You could solve using a difference of squares, but you could also just solve using square roots.

- $x^2 - 4 = 0$

Diff. of Squares

$x^2 - 4 = 0$

$x^2 - 2^2 = 0$

$(x+2)(x-2) = 0$

$x+2 = 0$ $\quad$ $x-2 = 0$

$x = -2$ $\quad$ $x = 2$

Square Roots

$x^2 - 4 = 0$

$+4 \quad +4$

$\sqrt{x^2} = \pm\sqrt{4}$

$x = \pm 2$

You should always use the easiest method when solving. Only use the difference of squares method when you can't use square roots. This happens if you don't only have x squared.

Ex: Solve $2x^3 = 18x$

$-18x \quad -18x$

Step 1 ✓ $2x^3 - 18x = 0$

Step 2 ✓ $2x(x^2 - 9) = 0$

Step 3 ✓ $2x(x+3)(x-3) = 0$

Step 4 $x = 0 \quad x = -3 \quad x = 3$

Ex: Solve $4x^4 - 144x^2 = 0$

$4x^2(x^2 - 36) = 0$

$4x^2(x^2 - 6^2) = 0$

$4x^2(x+6)(x-6) = 0$

$x = 0 \quad x = -6 \quad x = 6$

Homework:

U2.5 WS - "Differences of Squares"