Zero Product Property:

If
$$a \cdot b = 0$$
, then $a = 0$ or $b = 0$.

Use the Zero Product Property to find the zeros of this function.

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

Zeros are:

$$x = \frac{5}{3}$$

Use the Zero Product Property to find the value of x in each.

1
$$(x + 9)(x - 13) = 0$$
 $x = -9, 13$
 $x + 9 = 0$ $x = -9, 13$

These values of x are the solutions to the equation

They are also called the zeros of each factor or the zeros of the equation.

Since y = 0 these are also the x-intercepts of the graph.

They are also called roots of the function

Used the Zero Product Property to find the x-intercepts of this function

3.
$$y = 4x(x - 7)$$

$$\chi = 7,0$$

$$\frac{4x=0}{x=0} \quad x-7=0$$

$$x=0 \quad x=7$$

Section 5-5: Quadratic Equations

Quadratic Function in Standard Form:

$$y = ax^2 + bx + c$$

Quadratic Equation in Standard Form:

$$ax^2 + bx + c = 0$$

Classwork from yesterday

Solve each equation by factoring.

1.
$$48x^2 + 36x = 0$$

GCF

$$6 \times (8 \times +6)$$

 $2 \cdot 6 \times (9 \times +3)$
 $12 \times (9 \times +3) = 0$
 $(4 \times +3) = 0$

2.
$$x^{2} - 9x + 20 = 0$$

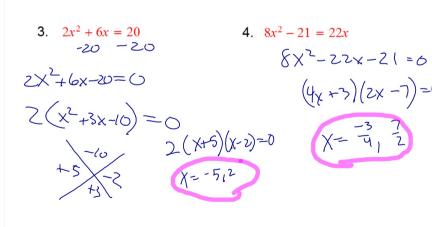
 $(x-5)(x-4) = 0$
 $(x-5)(x-4) = 0$

Solving Quadratic Equations by Factoring:

1st: Make sure one side = 0

2nd: Factor completely

3rd: Solutions are zeros of each factor



$$5. \quad 24x^3 + 72x^2 + 30x = 0$$

6.
$$45x^3 - 80x = 0$$

$$5x (9x^2 - 16)$$

 $5y (3x + 4)(3x - 4)$
 $X = 0, \pm \frac{4}{3}$

Solve this quadratic by factoring.

$$18k^2 - 8 = 0$$

$$2(3x + 2)(3x - 2) = 0$$

7.
$$36x^2 - 49 = 0$$

$$(6x+7)(x-7)$$

Another way to solve the following quadratic equation:

$$18k^2 - 8 = 0$$

$$\frac{18k^{2}-8}{18}$$

$$\sqrt{k^{2}-18}$$

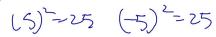
$$\sqrt{k^{2}-18}$$

$$+ \sqrt{\frac{8}{18}}$$

$$-\frac{1}{4}$$

$$-\frac{1}{3}$$

What numbers could you square and get 25?



What are the square roots of 100? ±10

Every Positive Number has two square roots ±

Find the exact solutions to

1.
$$6x^2 - 7 = 17$$

2. $6x^2 - 7 = 1$

12 - 14M

Solving Quadratic Equations with Square Roots:

You can use Square Roots to solve a Quadratic Equation

ONLY IF there is no linear term (b = 0)

Steps to follow if solving using square roots:

- 1. Isolate x^2 or $(x^2)^2$ on one side of the equation
- 2. Take the square root of both sides
- 3. Finish solving for x (if necessary)

Why can't you solve the following equation using square roots?

$$x^2 - 16x + 49 = 0$$

 $-49 - 49$

To solve for x you would get an x in your answer but that means you wouldn't have actually gotten x by itself!

Therefore, if there is bx in the problem you can't get x by itself using square roots.

What are the solutions to this equation?

$$x^{2} + 81 = 0$$
 $-81 = -81$
 $\sqrt{x^{2}} = -81$

No Real Solutions

The square root of a negative is not a real number!

You can now finish Hwk #20

Sec 5-5

Pages 270-271

Problems 2, 3, 5-7, 10, 11, 13, 14, 35, 51, 52