Section 5-5: Quadratic Equations Standard Form of a Quadratic Equation:

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

A quadratic equation could also come in the following form:

$$0 = a(x - h)^2 + k$$

But this wouldn't be called Standard Form!

Solving by Factoring:

This method uses the Zero-Product Property

Property

Zero-Product Property

If
$$ab = 0$$
, then $a = 0$ or $b = 0$.

Example If
$$(x + 3)(x - 7) = 0$$
, then $(x + 3) = 0$ or $(x - 7) = 0$.

To solve a quadratic equation by factoring you must

have one side =0 (Standard Form of a Quadratic Equation)

Then you factor the other side.

Solutions are the zeros of the factors.

Solving Quadratic Equations

Methods to solve Quadratic Equations:

- Factoring
- Square Roots
- Quadratic Formula
- Completing the Square
- Graphing

Solving Quadratic Equations

Methods to solve Quadratic Equations:

- Factoring Works only SOME of the time.
- Square Roots Works only SOME of the time.
- Quadratic Formula Works ALWAYS.
- Completing the Square Works only SOME of the time.
- Graphing Works only IF you have technology and doesn't always give exact answers.

Solve by factoring. $\left(-1\right)\left(-x^2-x+30\right)=\left(0\right)\left(-1\right)$

 $X^{2} + X - 30 = 0$

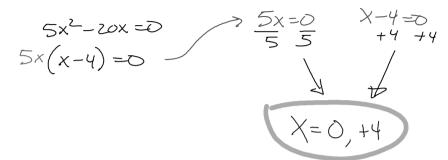
It's always easier to factor and solve when a is positive. There are several ways to accomplish this:

- 1. Multiply or divide both sides of the equation by -1.
- 2. Move all terms to the right side.
- 3. Factor out -1.

$$(x+6)(x-5) = 0$$
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Solve by factoring.

$$5x^2 = 20x$$
 must move all terms to one side first



Solve by factoring.

$$10x^2 + 34x = 24$$
 first move all terms to one side

$$|0x^{2} + 34x - 24 = 0$$

$$2(5x^{2} + 17x - 12) = 0$$

$$+20 + 3 + 34x - 24 = 0$$

$$2(x + 4)(5x - 3) = 0$$

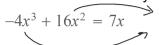
$$x + 44$$

$$x = -4, 3/5$$

$$x + 40$$

$$x = -4, 3/5$$

Solve by factoring.



To get a to be positive you could move all terms to the right side.

$$0 = 4x^3 - 16x^2 + 7x$$

$$0 = x (4x^2 - 16x + 7)$$

$$\begin{array}{c|c}
28 & 2x & -7 \\
-14 & 2x & |4x^2| - |4x| \\
-16 & |-2x| + 7
\end{array}$$

$$\chi(2x-7)(2x-1)$$

$$\chi = 0, \frac{7}{2}, \frac{1}{2}$$

Solve by factoring.

When you move all terms to one side make sure you write the result in Standard Form so that you don't confuse a, b, and c when factoring.

$$9x^2 - 7 = 18x$$
$$-/8x - -/8x$$



$$3x +1$$

$$3x | 9x^2 | +3x$$

$$-7 | -2/x | -7$$

$$(3x+1)(3x-7)=0$$

 $X=-\frac{7}{3},\frac{7}{3}$

Solve by factoring.

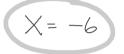
$$3x^2 + 36x + 108 = 0$$

$$3(x^{2}+12x+36)=0$$

$$3(x+6)(x+6)=0$$

$$(x+6)(x+6)=0$$

$$3(x+6)(x+6) = 0$$



this is really two solutions but they are the same number.

You can now finish Hwk #13

Practice Sheet

Sec 5-5

Solve by factoring