Let's Solve This Stuff!

Last class we did a whole lot of factoring. But, we didn't actually solve any of the equations! That's what today is for.

Here's what we do:

1. Set our equation equal to zero
   - ➢ Sometimes you may need to rearrange the equation
2. Factor.
   - ➢ Completely. We must have all multiplied terms.
3. If everything is multiplied, we can make the claim that at least one of those things must be zero.
   - ➢ If xy=0 then either x or y must be zero.

Example time!

$x^2 - 6x + 8 = 0$

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

$x-4=0$ or $x-2=0$

$x=4$ $\quad x=2$

$x = 2, 4$

$4x^2 + 12x = -9$

$4x^2 + 12x + 9 = 0$

$m \to 36$

$a \to 12$

$6 \quad 6$

$4x^2 + 6x + 6x + 9$

$2x(2x+3) + 3(2x+3)$

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

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

$2x + 3 = 0$

$x = -\frac{3}{2}$

$6x^2 + 2x = 0$

$2x(3x + 1) = 0$

$2x = 0$ or $3x + 1 = 0$

$x = 0$ $\quad x = -\frac{1}{3}$

$x = 0, -\frac{1}{3}$

$2(x - 3)^2 + 7(x - 3) + 5 = 0$

Let $x - 3 = R$

$2R^2 + 7R + 5 = 0$

$(5, 2)$

$2R^2 + 5R + 2R + 5 = 0$

$R(2R + 5) + (2R + 5) = 0$

$(2R + 5)(R + 1) = 0$

$R = -1, -\frac{5}{2}$

$$x - 1 = \frac{2}{x}$$

$$x - \frac{2}{x} - 1 = 0$$

$$x^2 - x - 2 = 0$$

$$(x-2)(x+1) = 0$$

$$x = -1, 2$$

$$\frac{x}{3} + \frac{2}{6} = 5$$

$$\frac{x}{3} + \frac{1}{3} - 5 = 0$$

$$\frac{x}{3} + \frac{1-15}{3} = 0$$

$$\frac{x}{3} - \frac{14}{3} = 0$$

$$x = \frac{14(3)}{3}$$

$$x = 14$$

We could also ask you to find the quadratic equation that has specific roots…

Example: Write a quadratic equation with the given roots:

-5,-3

$x = -5$ or $x = -3$

$x + 5 = 0$ $\quad$ $x + 3 = 0$

$$(x+5)(x+3) = 0$$

$$x^2 + 8x + 15 = 0$$

4,-2

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

$x^2-2x-8=0$

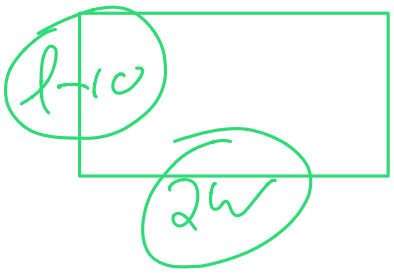
$\frac{-3}{2}, \frac{1}{4}$

$(2x+3)(4x-1)=0$

$8x^2+10x-3=0$

Word Problem:

The Length of a lacrosse field is 10m less than twice the width. The area of the field is 6,600m^2. Find the dimensions of the field.



$A = lw = 6,600$

$(2w-10)w = 6600$

$2w^2-10w-6600=0$

$2(w^2-5w-3300)=0$

$l = 2w-10$

$w = w$

$w = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

$w = 60$, ~~-55~~ real world

$l = 2(60) - 10$

$= 120 - 10$

$= 110$ m

HW: pg230

#7,9-11,12a,19,30