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!

$x^2 - 6x + 8 = 0$ $\quad -4, -2$

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

$x = 2$ or 4

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

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

$n \to 36$

$a \to 12$

$(6, 6)$

$4x^2 + 6x + 6x + 9 = 0$

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

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

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

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

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

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

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

Let $R = x-3$

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

$a \to 10$

$a \to 7$

$(5, 2)$

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

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

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

sub

$[2(x-3)+5]((x-3)+1) = 0$

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

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

$$x(x-1)=\left(\frac{2}{x}\right)x$$

$$x^2 - x = 2$$
$$x^2 - x - 2 = 0$$
$$(x-2)(x+1) = 0$$
$$x = 2 \quad \text{or} \quad -1$$

$$6\left(\frac{x}{3}+\frac{2}{6}\right)=(5)6$$

$$2x + 2 = 30$$
$$2x = 28$$
$$x = 14$$

$$x + 1 = 15$$
$$x = 14$$

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

$$x = -5 \quad \text{and} \quad x = -3$$
$$x + 5 = 0 \qquad x + 3 = 0$$
$$(x+5)(x+3) = 0$$
$$x^2 + 8x + 15 = 0$$

4, -2

$x = 4 \quad x = -2$

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

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

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

$x = -\frac{3}{2} \quad x = \frac{1}{4}$

$(x + \frac{3}{2})(x - \frac{1}{4}) = 0$

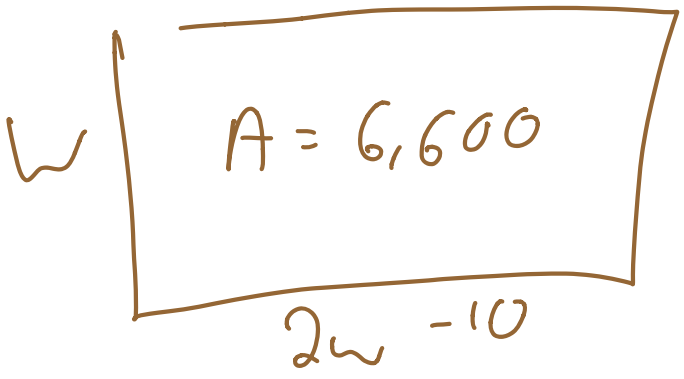
$x^2 - \frac{x}{4} + \frac{6x}{4} - \frac{3}{8}$

$8\left(x^2 + \frac{5x}{4} - \frac{3}{8} = 0\right)8$

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

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.



$A = lw$

$6600 = w(2w - 10)$

$$0 = 2w^2 - 10w - 6600$$
$$= w^2 - 5w - 3300$$
$$= \left(w - \frac{5}{2}\right)^2 - \left(\frac{5}{2}\right)^2 - 3300$$
$$\sqrt{3300 + \frac{25}{4}} = \sqrt{\left(w - \frac{5}{2}\right)^2}$$
$$\sqrt{3300 + \frac{25}{4}} + \frac{5}{2} = w$$

$w = 60$ m
$\ell = 110$ m

HW: pg230
#7,9-11,12a,19,30