HAT
Quadratic Graphs and Factoring

9/19/17

$87^2 - 86^2 = ?$ 87+86

$(87+86)(87-86)$

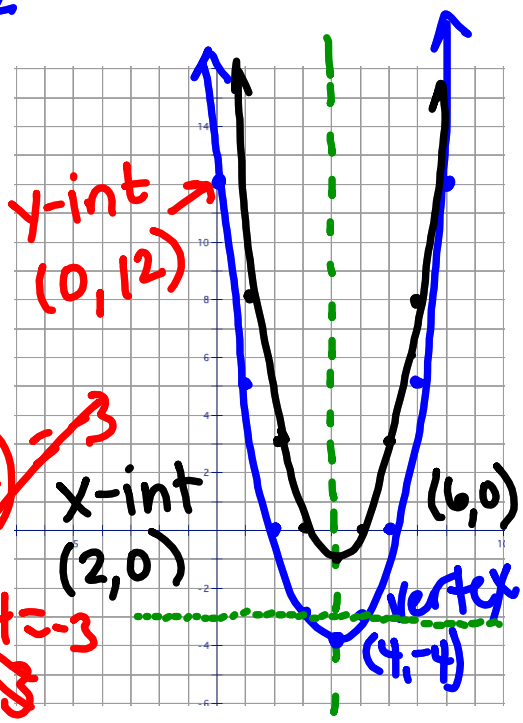
$(87+86)(1)$

Warm Up:

a behave like x^2

Graph $f(x) = x^2 - 8x + 12$

Label the important features.
Use correct vocabulary and notation.



Solve $x^2 - 8x + 12 = -3$

x=3
x=5

On the same axes, graph

$f(x) = x^2 - 8x + 15$

What is the connection between these two graphs?

$(x+2)(x-4) = -3$
$x+2=-3$ or $x-4=-3$
$a \cdot b = -3$

$x^2 - 8x + 12 = -3$
$+3 \quad +3$

Add to -8

Mult to 15

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

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

$x-3=0$ OR $x-5=0$

$x=3 \quad x=5$

Ex#1: Without graphing, solve $x^2 - 8x + 12 = -3$

Factor
FOIL
Zeros, Roots, x-intercepts
Zero Product Property

Our proficiency with this work relies on us becoming EXPERT factorers!

Review of Factoring Techniques:

#1.

- Greatest Common Factor

$$20x^2 + 15x = 0$$

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

$5x=0 \quad 4x+3=0$

$x=0$, $x=-3/4$

- Perfect Square

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

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

$2x-3=0$

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

- Difference of Squares

$$x^2 - 64 = 0$$

$(x+8)(x-8)=0$

$x+8=0 \quad x-8=0$

$x=-8$, $x=8$

- General Trinomial

$$6x^2 + 13x - 5 = 0$$

1,6 / 2,3 ← $6x^2+13x-5$ → 1,5

$-2x$

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

$15x$

$2x+5=0 \quad 3x-1=0$

$x=\frac{-5}{2}$, $x=1/3$

More often, we see multiple factoring techniques in the same problem...

Ex#2: Factor completely

a) $30x^2 + 25x - 20$

1,6
3,2
1,4
2,2

$5(6x^2+5x-4)$

$-3x$

$5(3x+4)(2x-1)$

$+8x$

$5(3x+4)(2x-1)$

b) $4x^2 - 256$

$4(x^2-64)$

$4(x+8)(x-8)$

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

$(2x+16)(2x-16)$

$2(x+8)\cdot 2(x-8)$

$4(x+8)(x-8)$

Ex#3: Write the equation of a quadratic function in standard form that has x-intercepts at $\left(\frac{3}{4},\ 0\right)$ and $\left(-5,\ 0\right)$

Assignment: page 242 #23, 27, 28, 29, 33, 34, 35, 37, 39, 43, 51, 52, 56, 66, 69, 70, 80, 81