4.3 Factoring Trinomials (when a=1)

Opener

a) Put the following in Factored Form

$$y = 3x^2 - 30x$$

$$y = 3x(x-10)$$

$\boxed{y=0}$

b) Find the zeros

$$0 = 3x$$

$$0 = x - 10$$

c) Find the vertex

$\boxed{0 = x}$ $\boxed{10 = x}$

d) Sketch

$$x = \frac{0+10}{2}$$
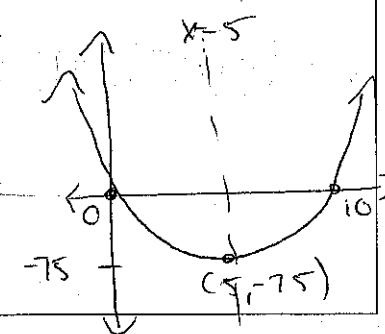
$\boxed{x = 5}$

$$y = 3(5)^2 - 30(5)$$

$$y = 3(25) - 150$$

$$y = 75 - 150$$

$\boxed{y = -75}$

$$V(5, -75)$$

$(5, -75)$

Expand each of the following and put into standard form (use another sheet of paper for your rough work)

Factored Form	Standard Form	Value of b	Value of c
y = (x+3)(x+4)	$y = x^2 + 7x + 12$	7	12
y = (x+3)(x+5)	$y = x^2 + 8x + 15$	8	15
y = (x+3)(x+6)	$y = x^2 + 9x + 18$	9	18
y = (x+4)(x+4)	$y = x^2 + 8x + 16$	8	16
y = (x-3)(x+5)	$y = x^2 + 2x - 15$	2	-15
y = (x-1)(x-5)	$y = x^2 - 6x + 5$	-6	5

What pattern do you notice about the b and c values when a =1?

$$r + s = b$$

$$r \times s = c$$

- Factoring a trinomial means working backwards from expanding

$$y = x^2 - x - 72 \longrightarrow$$ Need $\overset{2}{\text{numbers}}$ that add to

-1 and $\bigvee$ -72

multiply to

Step 1 – Make an Add/Multiply Chart (A/M chart) and T-chart to help you find your multiples

Add to b	Multiply to (c)(a)
-1	$(1)(-72)$

Find all multiples, make a T-chart

-72

-1	72
-2	36
-3	24
-6	12
-8	9
-9	8

$-8 + 9 = +1$
$+8 - 9 = -1$

✱ Note 1 number must be (-) to get -72

- The numbers $+8$ and -9 add to -1 (b value) and multiple to -72 (c value)

Step 2 – Split your b value (doesn't matter which # goes first)

$$y = x^2 - x - 72$$

$$y = \underbrace{x^2 + 8x}_{1^{st}} \underbrace{- 9x - 72}_{2^{nd}}$$ GCF: x and -9

$$y = x(x + 8) - 9(x + 8)$$ GCF: $(x+8)$

$$\boxed{y = (x+8)(x-9)}$$

Step 3 – the rest is just factoring – factor the 1st 2 terms and the last 2 terms separately

Ex 2. $y = x^2 - 13x + 36$	Homework p.211 #4, 7, 8, 9, 13