Day 4
HW/Notes

COMPLETING THE SQUARE

OBJECTIVES:

1) Complete the square to convert a quadratic from standard form to vertex form.
2) Graph a quadratic in vertex form.

Fill in the table below.

Perfect Square Trinomial	Factored Form
$x^2 + 8x + 16$	$(x+4)^2$
$x^2 - 8x + 16$	
	$(x-3)^2$
$x^2 - 30x + 225$	

Fill in the constant to make the expression a perfect square trinomial.

1) $x^2 - 22x + \_\_\_\_\_$ 2) $9x^2 - 36x + \_\_\_\_\_$ 3) $x^2 - .4x + \_\_\_\_\_$

What if they are not perfect square trinomials? We use completing the square to change it!

STANDARD FORM
$y = ax^2 + bx + c$

VS.

VERTEX FORM
$y - k = a(x-h)^2$
(h, k) is the vertex

Example: $y = 4x^2 - 8x + 1$

COMPLETING THE SQUARE

1.) Move the constant to the side with y

2.) Factor out the quadratic coefficient

3.) Take $\frac{1}{2}$ of the linear coefficient and square it. Add this number inside the parentheses.

BALANCE THE EQUATION!

4.) Factor the quantity in parentheses. List your vertex.

PRACTICE:

1.) $y = 4x^2 - 24x + 29$

COMPLETING THE SQUARE

1.) Move the constant to the side with y

2.) Factor out the quadratic coefficient

3.) Take $\frac{1}{2}$ of the linear coefficient and square it. Add this number inside the parentheses.

BALANCE THE EQUATION!

4.) Factor the quantity in parentheses. List your vertex.

2.) $y = -3x^2 + 24x - 53$

$y+53 = -3(x^2-8x)$

$y+53-48 = -3(x^2-8x+16)$

$y+5 = -3(x-4)^2$

vertex: $(4,-5)$

3.) $y = 2x^2 + 4x + 5$

$y-5 = 2(x^2+2x)$

$y-5+2 = 2(x^2+2x+1)$

$y-3 = 2(x+1)^2$

vertex: $-1, 3$

4.) $y = -\frac{1}{4}x^2 - x + 3$

5.) $y = \frac{1}{2}x^2 - 3x + \frac{19}{2}$

$y - \frac{19}{2} = \frac{1}{2}(x^2-6x)$

$y - \frac{19}{2} + \frac{9}{2} = \frac{1}{2}(x^2-6x+9)$

$y - \frac{10}{2} = \frac{1}{2}(x-3)^2$

$y-5 = \frac{1}{2}(x-3)^2$

vertex: $(3, 5)$

6.) $y = x^2 + 11x + 3$

7.) $y = x^2 + 25x - 8$

$y+8 = x^2+25x$

$y+8+\frac{625}{4} = x^2+25x+\frac{625}{4}$

$y+\frac{32}{4}+\frac{625}{4} = (x+\frac{25}{2})^2$

$y+\frac{657}{4} = (x+\frac{25}{2})^2$

Vertex: $(\frac{-25}{2}, -\frac{657}{4})$