

# Bellwork: Algebra 1

1. Happy Wednesday!!
2. You need a calculator and your composition book.
3. Turn in your assignment from yesterday if you did not do that already.
4. MATH NATION SECTION 6 TEST YOURSELF IS DUE NEXT WEDNESDAY 3/11
5. Answer the following question on your WEDNESDAY Bellwork:

Find the following features of the equation:

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

$$X = \frac{-b}{2a} = \frac{-(-1)}{2(1)} = \frac{1}{2}$$

Axis of Symmetry:  $X = \frac{1}{2}$   $X = 0.5$

Vertex:  $(0.5, -2.25)$

Y-Intercept:  $(0, -2)$

X-Intercepts:  $(-1, 0)$   $(2, 0)$   
 $X = \{-1, 2\}$

$$y = (0.5)^2 - (0.5) - 2$$
$$0.25 - 0.5 - 2 = -2.25$$

	X	1	
X	$X^2$	X	$-2X$
-2	$-2X$	-2	$-2$

$-2$   $-2X$   $-2$   $-2X$   $-2$

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

$$X+1=0 \quad X-2=0$$

$$X = -1$$

$$X = 2$$

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

$$3. h(x) = x^2 + 6x + 5$$

# NOTES - QUADRATIC FUNCTIONS

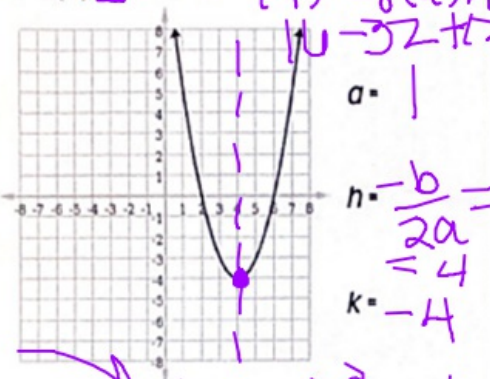
Convert from **STANDARD** Form to **VERTEX** Form

(h, k)

<b>GOAL</b>	Standard Form:	Vertex Form:
	$y = ax^2 + bx + c$	$f(x) = a(x-h)^2 + k$

Write the function in vertex form by identifying a from the standard form and h and k from the graph

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



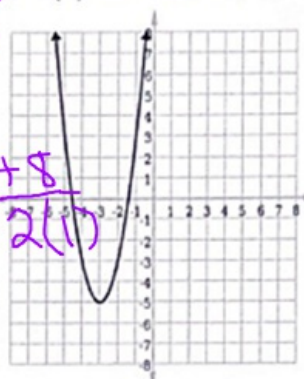
$a = 1$

$h = \frac{-b}{2a} = \frac{+8}{2(1)} = 4$

$k = -4$

$f(x) = (x-4)^2 - 4$

B)  $f(x) = 2x^2 + 12x + 13$



$a =$

$h =$

$k =$

$f(x) =$

Write the function in vertex form by identifying a and finding h and k algebraically using the standard form.

C)  $f(x) = -x^2 + 10x - 20$

$a = -1$

$h = \frac{-b}{2a} = \frac{-10}{2(-1)} = 5$

$k =$

$(-5)^2$   
 $\downarrow$   
 $(5)^2 + 10(5) - 20$   
 $= 25 + 50 - 20$   
 $= 5$

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

D)  $f(x) = 4x^2 + 48x + 148$

$a = 4$

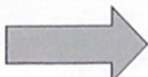
$h = \frac{-b}{2a} = \frac{-48}{8} = -6$

$k =$

$4(-6)^2 + 48(-6) + 148$   
 $4(36) - 288 + 148$   
 $144 - 288 + 148 = 4$

$f(x) = 4(x+6)^2 + 4$

## Convert from VERTEX Form to STANDARD Form

<b>GOAL</b>	Vertex Form:		Standard Form:
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Write the function in standard form by squaring the binomial, rewrite the equation by replacing the binomial with the trinomial, distribute a, then combine like terms.

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

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

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

4.  $y = -4(x - 1)^2 - 4$

Write the function in factored form by first writing in standard form, then factoring.

5.  $y = -3(x - 1)^2 + 27$

6.  $y = (x - 1)^2 - 9$