

Name: "Teacher"

1st Date 4/9/18

Section 2.0.5

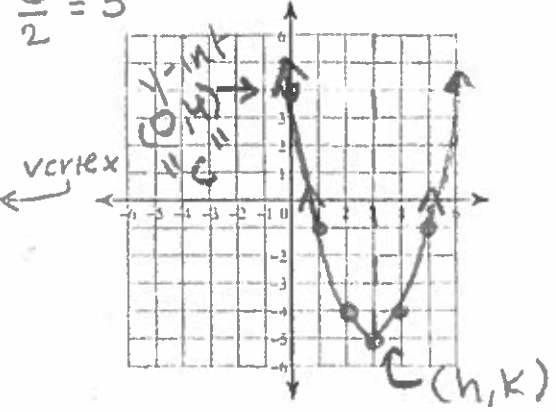
Quadratic Functions - Standard Form $f(x) = ax^2 + bx + c \rightarrow y$ -intercept

Steps to Graph

- 1) Find the vertex and the axis of symmetry using the formula: $h = \frac{-b}{2a}$
- 2) Find 2 points on one "arm" of the parabola.
- 3) Use the axis of symmetry to reflect the points and make the parabola.

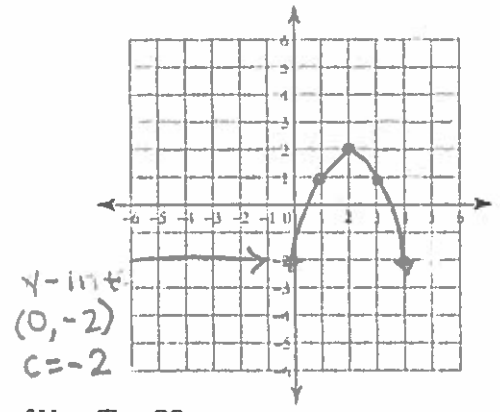
Ex. 1 $f(x) = x^2 - 6x + 4$ $h = \frac{-(-6)}{2(1)} = \frac{6}{2} = 3$

x	$F(x) = x^2 - 6x + 4$	y	$f(x) = y$	(x, y)
3	$(3)^2 - 6(3) + 4$	-5	$f(3) = -5$	(3, -5)
2	$(2)^2 - 6(2) + 4$	-4	$f(2) = -4$	(2, -4)
1	$(1)^2 - 6(1) + 4$	-1	$f(1) = -1$	(1, -1)
0	$(0)^2 - 6(0) + 4$	4		



You Try 2 $f(x) = -x^2 + 4x - 2$
 $h = \frac{-b}{2a} = \frac{-4}{2(-1)} = \frac{-4}{-2} = 2$

x	$-x^2 + 4x - 2$	y	$f(x) = y$	(x, y)
2	$-(2)^2 + 4(2) - 2$	2	$f(2) = 2$	(2, 2)
1	$-(1)^2 + 4(1) - 2$	1	$f(1) = 1$	(1, 1)
0	$-(0)^2 + 4(0) - 2$	-2	$f(0) = -2$	(0, -2)



Can you figure out the vertex form of the function from the graph of You Try 2?

What is the a value? $a = -1$ vertex: (2, 2)

What is the horizontal transformation? (h, k)

2 units to the right $h = 2$

What is the vertical transformation?

2 units up $k = 2$

What is the vertex form of the quadratic function?

$y = a(x-h)^2 + k \rightarrow y = -(x-2)^2 + 2$

What is the vertex form of the quadratic function?

Ex. 3 $f(x) = 2x^2 - 8x + 7$

$h = \frac{-b}{2a} = \frac{-(-8)}{2(2)} = \frac{8}{4} = 2$
 $k = f(h) = 2(2)^2 - 8(2) + 7 = 2(4) - 16 + 7 = 8 - 16 + 7 = -1$
 $a = 2$
 $y = 2(x-2)^2 - 1$

You Try 4

$y = -3x^2 + 18x - 4$
 $h = \frac{-b}{2a} = \frac{-18}{2(-3)} = \frac{-18}{-6} = 3$
 $k = f(h) = -3(3)^2 + 18(3) - 4 = -27 + 54 - 4 = 23$
 $a = -3$
 $y = -3(x-3)^2 + 23$

$$h = \frac{-b}{2a} = \frac{-12}{2(-3)} = \frac{-12}{-6}$$

$$h = 2$$

Multiple Choice Practice - SHOW WORK/JUSTIFY YOUR REASONING.

1) What is the vertex of the graph of $y = -3x^2 + 12x + 1$?

- a. (13, 2) **(b.) (2, 13)** c. (0, 1) d. (1, 0)

$$h = 2 \quad y = -3(2)^2 + 12(2) + 1 = 13 \rightarrow k$$

2) What direction will the graph of $y = -3x^2 + 12x + 1$ open? What type of vertex will it have?

- a. upwards, minimum c. downwards, minimum
 b. upwards, maximum **(d.) downwards, maximum**

$$a = -3 \quad \text{---} \quad \text{---}$$

3) Match each function with the graph. EXPLAIN WHY YOU CHOSE EACH MATCH.

I. $y = -x^2 - 6x$



II. $y = -x^2 + 6$

B

III. $y = x^2 - 6$

A

IV. $y = x^2 + 6x$

D

