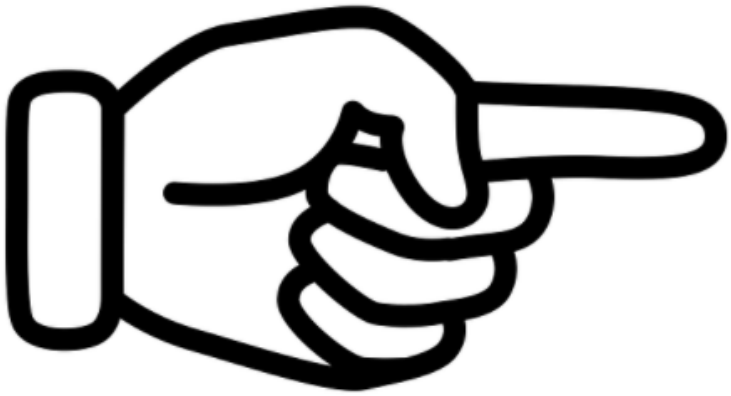
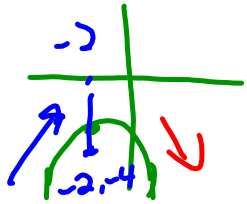
Warm-Up (EOC Type) 3/7/18

Read the following question carefully and answer it.



The function $f(x)$ is defined as $f(x) = -4(x + 2)^2 - 4$. Which of the following statements correctly describes how this function changes over various intervals of its domain?



increase: $(-\infty, -2)$

decrease: $(-2, \infty)$

A. The function is increasing on the interval $(-\infty, \infty)$ and is negative on the interval $(-\infty, \infty)$.

B. The function is increasing on the interval $(-\infty, -4)$ and decreasing on the interval $(-4, \infty)$. It is positive on the interval $(-\infty, 2)$ and negative on the interval $(2, \infty)$.

C. The function is increasing on the interval $(-\infty, 2)$ and decreasing on the interval $(2, \infty)$. It is positive on the interval $(-\infty, -4)$ and negative on the interval $(-4, \infty)$.

D. The function is increasing on the interval $(-\infty, -2)$ and decreasing on the interval $(-2, \infty)$. It is negative on the interval $(-\infty, \infty)$.

Home Work Review - Day 6 Graphing Standard Form

Graph the following quadratic functions. You must show how you calculated the vertex.

$f(-2) = -(-2)^2 - 4(-2) - 3 = 1$

2. $y = -x^2 - 4x - 3$

$a = -1 \quad b = -4$

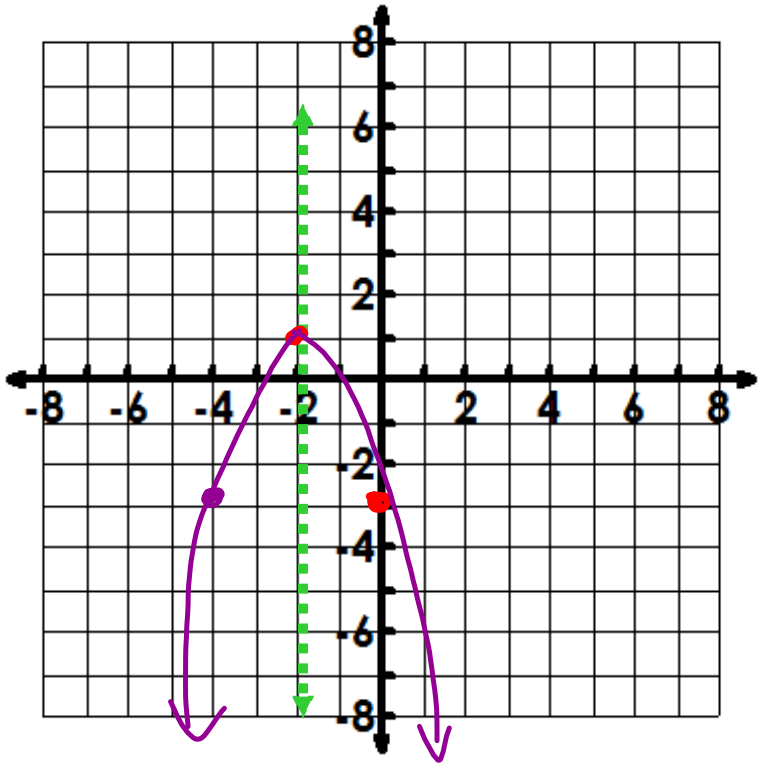
$c = -3$

y-int: $(0, -3)$

$x = \frac{-b}{2a}$

$x = \frac{-(-4)}{2(-1)}$

$x = \frac{4}{-2} \quad x = -2$



Home Work Review - Day 6 Graphing Intercept Form

Graph the following quadratic functions. You must show how you calculated the vertex.

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

x-int: (-2,0), (-4,0)

$X = \frac{-2 + -4}{2}$

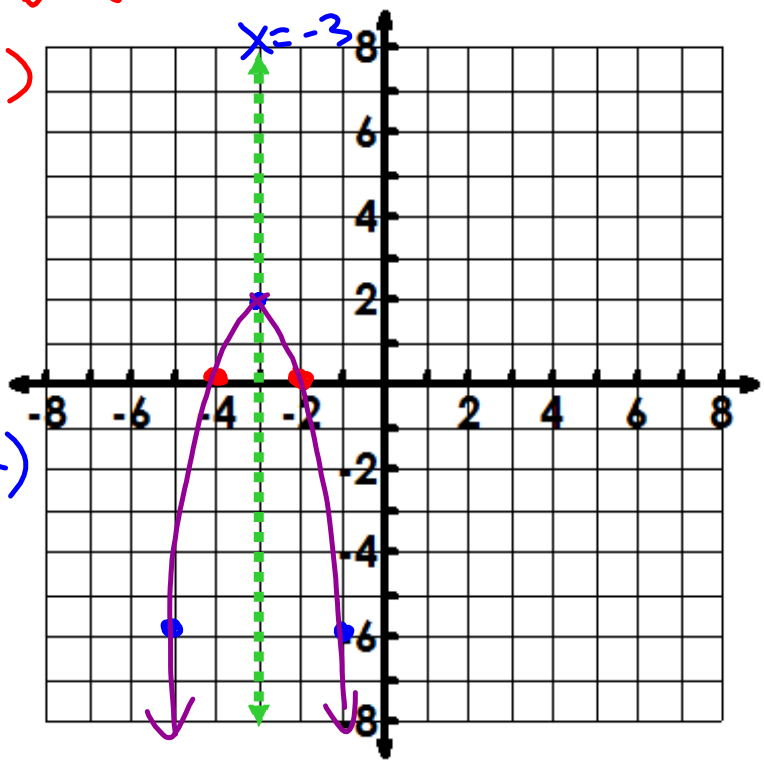
$X = \frac{-6}{2} = -3$

$f(-3) = -2(-3+2)(-3+4)$

$= -2(-1)(1)$

$f(3) = 2$

$V = (-3, 2)$



DAY 7: WRITING EQUATIONS OF PARABOLAS

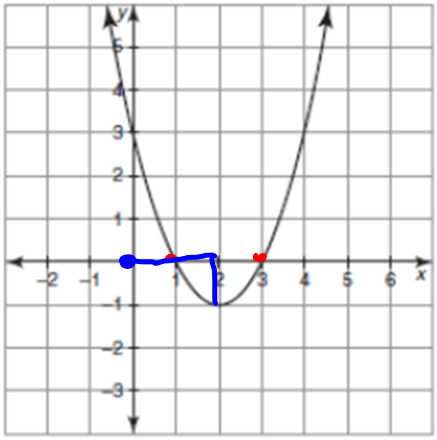
Unit 3B: Quadratic Functions

Three Forms of Quadratic Equations

Vertex Form	Standard Form	Intercept Form (Factored Form)
$y = a(x - h)^2 + k$ (h, k) is the vertex	$y = ax^2 + bx + c$ $(0, c)$ c is the y-intercept	$y = a(x - p)(x - q)$ p and q are x-intercepts
a always determines the way the graph opens		

Example 1

a.



Intercept Form

$y=(x-1)(x-3)$

	x	-1
x	x^2	$-x$
-3	$-3x$	$+3$

Vertex Form

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

	x	-2
x	x^2	$-2x$
-2	$-2x$	4

Standard Form

$y=x^2-4x+3$

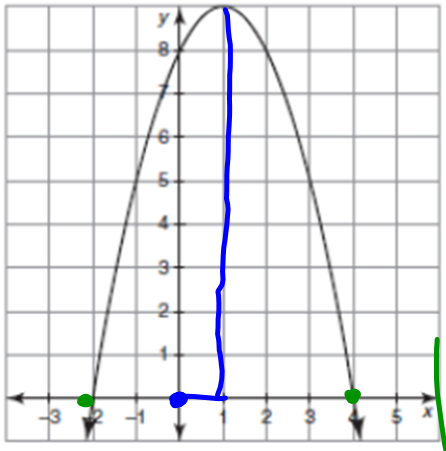
Standard Form

$x^2-4x+4-1$

$y=x^2-4x+3$

Example 2

b.



Intercept Form

$y = -(x+2)(x-4)$

	$-x$	-2
x	$-x^2$	$-2x$
-4	$4x$	8

Standard Form

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

$y = -(x^2-2x-8)$

Vertex Form

$y = -(x-1)^2+9$

	x	-1
x	x^2	$-x$
-1	$-x$	1

Standard Form

$y = -(x^2-2x+1)+9$

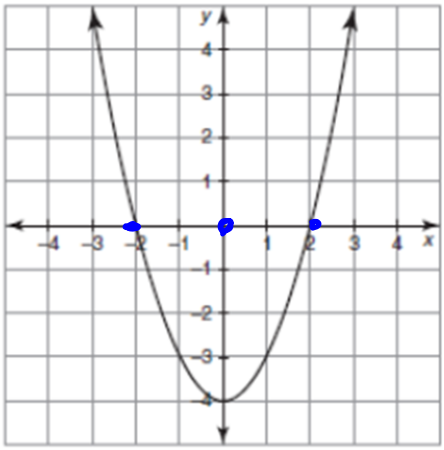
$y = -x^2+2x-1+9$

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

$y = -(x^2-2x-8)$

Example 3

c.



Intercept Form

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

	x	-2
x	x^2	$-2x$
2	$2x$	-4

Standard Form

x^2-4

Vertex Form

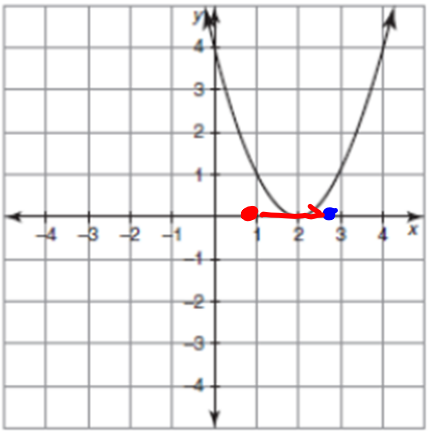
$y=x^2-4$

Standard Form

$y=x^2-4$

Example 4

d.



Intercept Form

$y=(x-2)(x-2)$

$y=(x-2)^2$

Vertex Form

$y=(x-2)^2$

	x	-3
x	x^2	$-2x$
-2	$-2x$	4

Standard Form

$y=x^2-4x+4$

Standard Form

$y=x^2-4x+4$

Example 5

e.

Intercept Form

Vertex Form

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

x +1

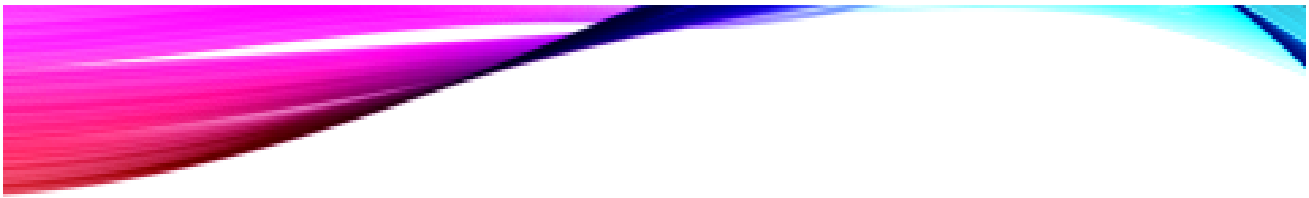
x^2	x
x	1

Standard Form

Standard Form

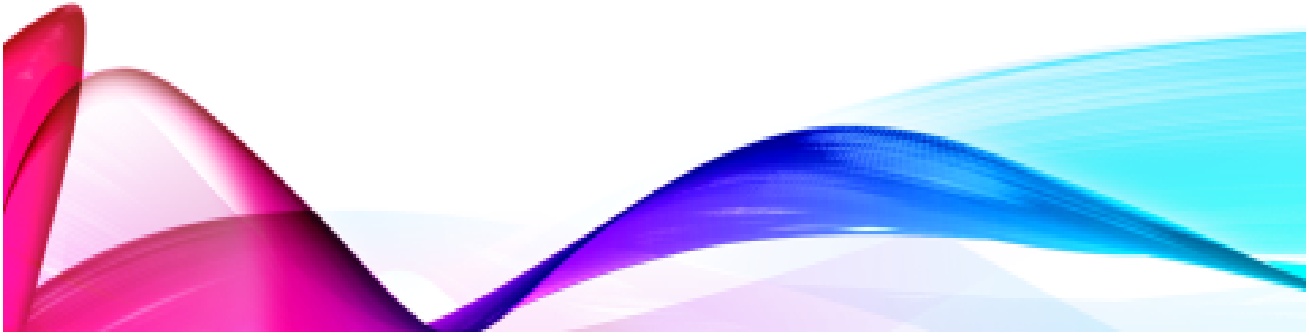
$x^2+2x+1+5$

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



DAY 8: COMPARING DIFFERENT FORMS OF QUADRATIC FUNCTIONS

Unit 3B: Quadratic Functions



Three Forms of Quadratic Functions

Vertex Form	Standard Form	Factored Form
$y = a(x - h)^2 + k$ (h, k) is the vertex	$y = ax^2 + bx + c$ c is the y-intercept	$y = a(x - p)(x - q)$ p and q are x-intercepts
a always determines the way the graph opens		

Practice 3/6/18

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

Form: Vertex

Information: Vertex: (2, 4)
$a = -3$ open down, Vertical stretch by 3

b. $y = (x - 4)(x + 1)$

Form: Intercept or Factored

Information: X-int: (4,0) (-1,0)

c. $y = 2x^2 + 4$

Form: Standard, Vertex

Information: Vertical stretch, up 4 units, Vertex — (0, 4)

d. $y = -4(x + 6)^2$

Form: Vertex

Information: Vertex: (-6, 0)
Vertical stretch - Opens down

e. $y = 4x^2 - 3x + 8$

Form: Standard

Information: (0, 8)

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

Form: Vertex

Information: Vertex (6, 1)

g. $y = x(2x + 6)$

$2x + 6 = 0$
$-6 \quad -6$
$\frac{2x}{2} = \frac{-6}{2}$

Form: Factored or intercept form

Information: x int (0, 0) (-3, 0)

h. $y = (-3x - 9)(x + 4)$

Form: Intercept or factored

Information: (-3, 0) (-4, 0)

Creating Equations Given Characteristics

Write a quadratic function in factored form to represent a parabola that opens downward and has zeros at (-4, 0) and (2, 0).

Sally
My function is f(x) = -(x – 2)(x + 4).

Jeremy
My function is f(x) = ½(x – 2)(x + 4).

Alex
My function is f(x) = 2(x – 2)(x + 4).

Monica
My function is f(x) = -2(x – 2)(x + 4).

Julie
My function is f(x) = -0.5(x – 2)(x + 4).

Derek
My function is f(x) = -(x + 2)(x - 4).

Explain

a. Which functions are similar to each other?

b. How is it possible to have more than one correct function?

c. What would you tell Alex, Jeremy, and Derek to correct their functions?

d. How many possible functions can you write to represent the given characteristics? Explain your reasoning.

Creating Equations

Write a quadratic function in vertex form to represent a parabola that opens upward and has a vertex at (-5, -2).

Sally
My function is $f(x) = 3(x + 5)^2 - 2$

Jeremy
My function is $f(x) = \frac{1}{4}(x + 5)^2 - 2$

Alex
My function is $f(x) = -2(x + 5)^2 - 2$

Monica
My function is $f(x) = (x + 5)^2 - 2$

Julie
My function is $f(x) = 2(x - 5)^2 + 2$

a. What would you tell Alex and Julie to correct their functions?

Practice

a. Vertex at (-5, 3) and opens down

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

b. x-intercepts at (3, 0) and (-5, 0) and opens up

$y=(x-3)(x+5)$

c. y-intercept at (0, 7) and opens down

$y=-(x^2+5x+7)$

d. x-intercepts at (0, 0) and (2, 0) and opens down

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

$y=-x(x-2)$

e. Vertex at (-3, 0) and opens down

$y=(x+3)^2$

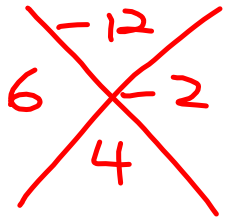
f. y – intercept at (0, -2) and opens up

$y=x(x+2)$

Converting between Forms

Standard to Factored – Factor your expression using GCF, number diamonds, or box method.

a. $y = x^2 + 4x - 12$



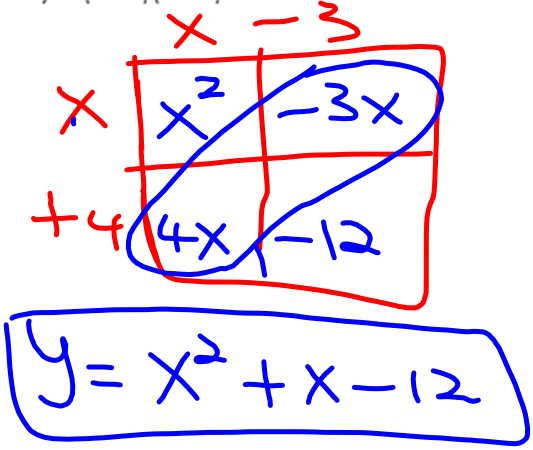
$y=(x+6)(x-2)$

b. $y = 3x^2 - 6x$

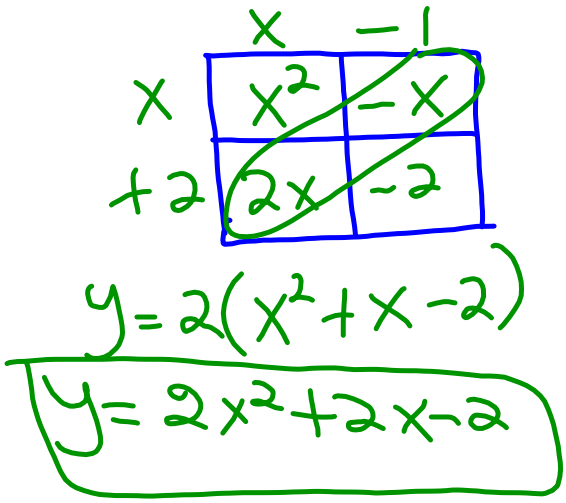
$y = 3x(x-2)$

Factored to Standard – Multiply your expressions together and place in standard form. Multiply a value through last.

a. $y = (x - 3)(x + 4)$

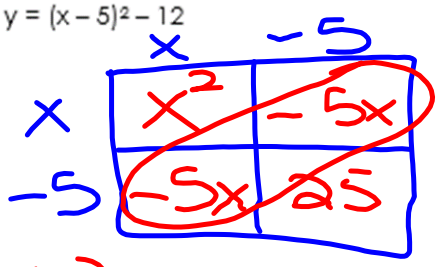


b. $y = 2(x - 1)(x + 2)$



Vertex to Standard – Expand your squared binomial, multiply the binomials, and add constants. Multiply a value through last.

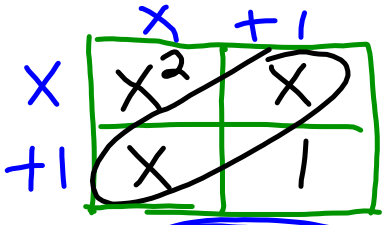
a. $y = (x - 5)^2 - 12$



$x^2 - 10x + 25 - 12$

$y = x^2 - 10x + 13$

b. $y = -3(x + 1)^2 + 4$



$y = -3(x^2 + 2x + 1) + 4$

$y = -3x^2 - 6x - 3 + 4$

$y = -3x^2 - 6x + 1$

Standard to Vertex - Determine your vertex (h, k) and keep the same a-value.

a. $y = x^2 + 4x + 3$

$-3 \quad -3$

$y - 3 = x^2 + 4x$

$\frac{4}{2} = 2^2 = 4$

$y - 3 + 4 = x^2 + 4x + 4$

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

$-1 \quad -1$

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

$h = -2 \quad k = -1$

b. $y = x^2 + 6x - 5$

$y + 5 = x^2 + 6x$

$\frac{6}{2} = 3^2 = 9$

$y + 5 + 9 = x^2 + 6x + 9$

$y + 14 = (x+3)^2$

$-14 \quad -14$

$y = (x+3)^2 - 14$

Home Work:

1. Day 7 Writing Equations of Parabolas # 1 - 7
2. Day 8 Different Forms of Quadratics # 1- 11

Both are due on Wednesday 3/7/18