Heritage High School – Distance Learning
Mr. Leong's Algebra 1 Assignment Packet
April 20 – April 23

Due Date: Tuesday, April 28 by 9:00am
Late work will not be accepted

Notes: Included in this packet are some note taking templates. Those with internet access can complete the notes as you watch the YouTube videos linked below.
- Describing Transformations of a Quadratic in Vertex Form
- Graphing Quadratic Equations in Vertex Form

Videos: *For students with internet access, please view the videos below. Students with limited internet access can use the teacher's notes at the end of this packet.*

Videos for the notes:
https://youtu.be/Pa3OWa5Yuhs
https://youtu.be/OlNbWZwygDM

Additional videos on transformations:
https://youtu.be/pW5z2gCTdDw
https://youtu.be/6wHpTJylbhs

Additional videos on graphing in vertex form:
https://youtu.be/bNPlMo3vBUY

Reading: Textbook p.442-444 (hint: use the Dynamic e-book on Clever to see video tutorials)

Exercises: Textbook p.446 #19-28, 30-32, 35-36
Please submit your answers through Clever and the Big Ideas Math site.
Those with limited internet access can email me a scan/photograph of their work.
Those without internet access may submit paper copies to the main office on Monday from 12-3pm.

Contact: leongc@luhsd.net
925.634.0037 ext. 6305
Remind @fnctn
Zoom office hours (TBA)

Accessing Big Ideas Through Clever

The preferred method of completing assignments is electronically through Clever.

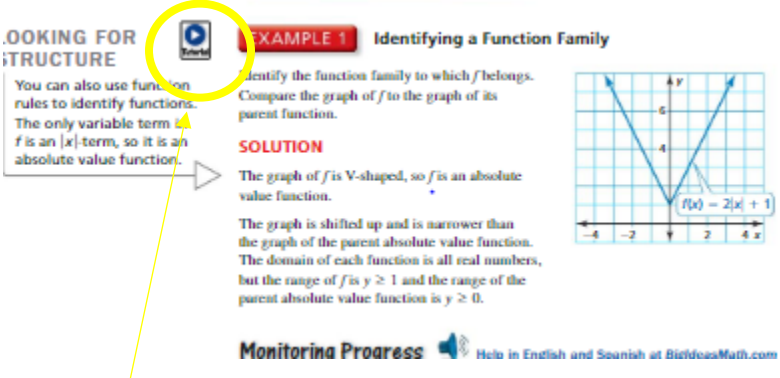
To access your assignments:

- Go to “clever.com/in/luhsd”
- Log in using your username and password as your student ID number
- Scroll down to “Math” where you will see the Big Ideas Math logo, click on “Big Ideas Math”
- If you are taking multiple math classes, you may need to select the book for the course you are working
- In the middle there is a tab that says “Assignments,” click on “Assignments”

- Choose an assignment to work on from the list. Click the pencil/enter to start the assignment.
- ***WARNING!!!!*** Clever does NOT automatically save and submit progress. Once you finish the last problem in an assignment, be sure to <u>click your name in the top-right corner and click “Submit”</u> to turn your assignment in.

To access online tutorial videos:

- Go to “clever.com/in/luhsd”
- Log in using your username and password as your student ID number
- Scroll down to “Math” where you will see the Big Ideas Math logo, click on “Big Ideas Math”
- If you are taking multiple math classes, you may need to select the book for the course you are working
- Click on “Student Dynamic ebook”
- You can use the “Contents” tab on the left to get to the section you wish to view
- In the section you will see examples that look similar to the below pic:



The blue circle with triangle indicates there is a tutorial video for that example. Click the icon to view.

Name:	Date:	Period:

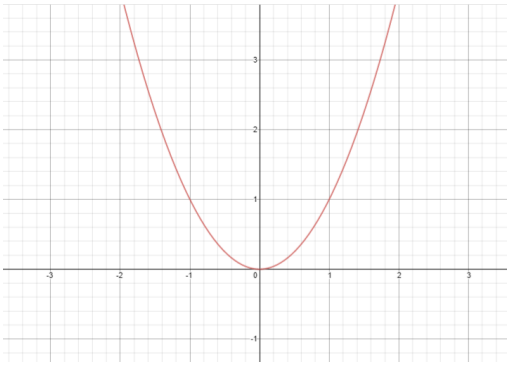
Notes: Describing Transformations of a Quadratic in Vertex Form

$$f(x) = a(x-h)^2 + k$$

Transformations	
	$a =$
	$h =$
	$k =$

EXAMPLES: Use the features of the vertex form quadratic equation to describe the transformations that occur from the parent function, f(x).

$f(x) = x^2$



1. $g(x) = (x-1)^2 + 2$

$a =$_____

$h =$_____

$k =$_____

2. $h(x) = -2(x+1)^2 - 3$

$a =$_____

$h =$_____

$k =$_____

You Try #1!!

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

$a =$_____

$h =$_____

$k =$_____

You Try #2!!

$h(x) = -(x-3)^2 - 4$

$a =$_____

$h =$_____

$k =$_____

You Try #3!!

$g(x) = \frac{1}{2}(x+5)^2 - 1$

$a =$_____

$h =$_____

$k =$_____

Name:	Date:	Period:

Notes: Graphing Quadratic Equations in Vertex Form

$$f(x) = a(x-h)^2 + k$$

Steps to Graph in Vertex Form	
	1.
	2.
	3.

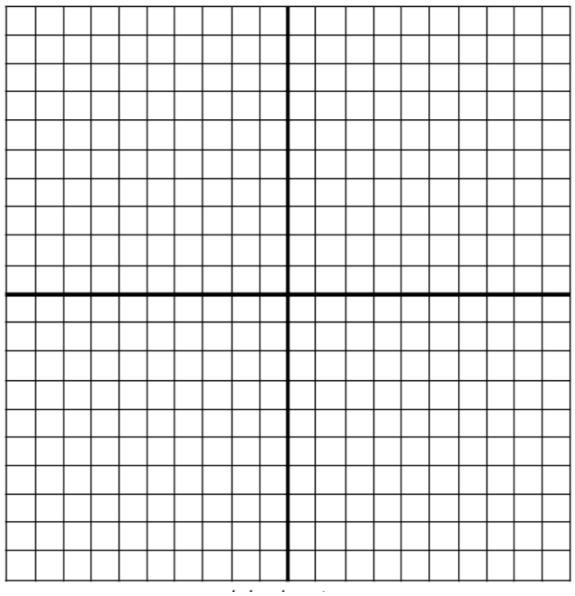
EXAMPLES: Use the steps listed above to graph the quadratic.

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

Axis of Symmetry: _____

Vertex: _____

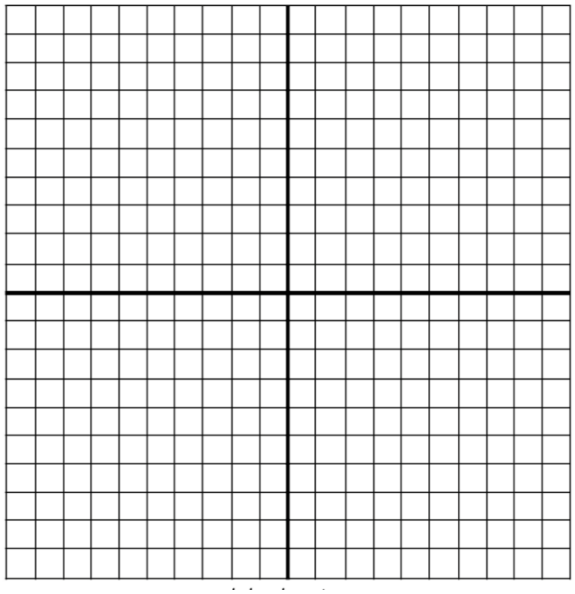
x	y



Domain: _____

Range: _____

2. $f(x) = -2(x+1)^2 - 3$



Axis of Symmetry: _____

Vertex: _____

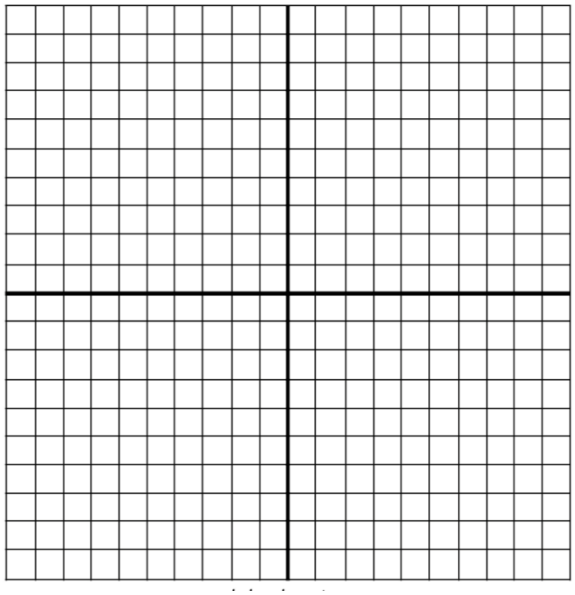
x	y

Domain: _____

Range: _____

You Try #1!!

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



Axis of Symmetry: _____

Vertex: _____

x	y

Domain: _____

Range: _____

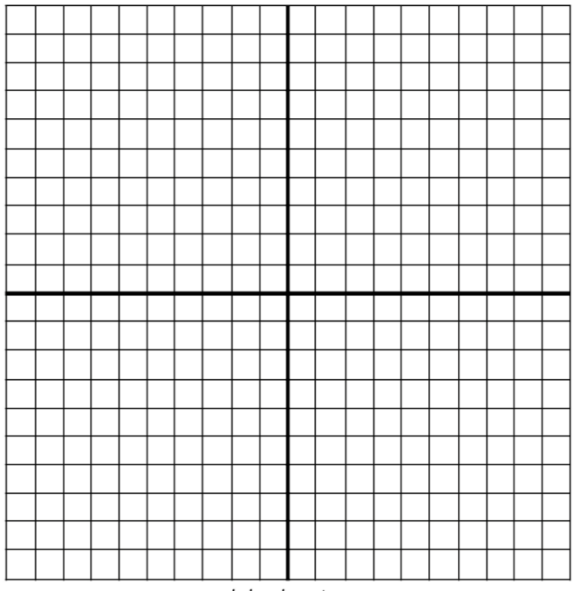
You Try #2!!

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

Axis of Symmetry: _____

Vertex: _____

x	y



Domain: _____

Range: _____

Name:	Date:	Period:

Notes: Describing Transformations of a Quadratic in Vertex Form

$$f(x) = a(x - h)^2 + k$$

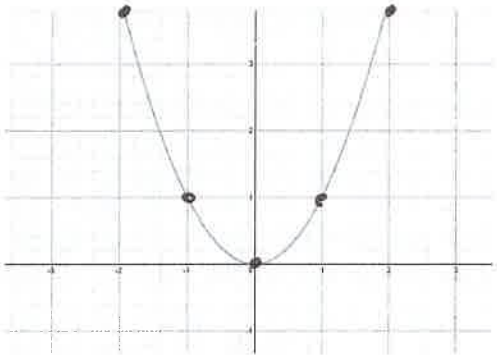
Transformations

$a =$	$a > 1$	vertical stretch
	$0 < a < 1$	vertical shrink
	$a < 0$	reflection across x-axis (concave down)
$h =$	$h > 0$	causes a shift to right
	$h < 0$	causes a shift to left
$k =$	$k > 0$	causes a shift up
	$k < 0$	causes a shift down

EXAMPLES: Use the features of the vertex form quadratic equation to describe the transformations that occur from the parent function, f(x).

$f(x) = x^2$

x	y
-2	4
-1	1
0	0
1	1
2	4



1. $g(x) = 1(x - 1)^2 + 2$

$a =$ 1

$h =$ 1 → shift right

$k =$ 2 → shift up

2. $h(x) = -2(x+1)^2 - 3$ $\quad h(x) = -2(x-(-1))^2 + (-3)$

$a =$ -2 ⟶ concave down, vertical stretch

$h =$ -1 ⟶ shift left

$k =$ -3 ⟶ shift down

You Try #1!!

$g(x) = (x+3)^2 - 1$ $\quad g(x) = 1(x-(-3))^2 + (-1)$

$a =$ 1

$h =$ -3 ⟶ shift left

$k =$ -1 ⟶ shift down

You Try #2!!

$h(x) = -(x-3)^2 - 4$ $\quad h(x) = -1(x-3)^2 + (-4)$

$a =$ -1 ⟶ concave down

$h =$ 3 ⟶ shift right

$k =$ -4 ⟶ shift down

You Try #3!!

$g(x) = \frac{1}{2}(x+5)^2 - 1$ $\quad g(x) = \frac{1}{2}(x-(-5))^2 + (-1)$

$a =$ 1/2 ⟶ vertical shrink

$h =$ -5 ⟶ shift left

$k =$ -1 ⟶ shift down.

Standard Form: $f(x) = ax^2 + bx + c$

Name:	Date:	Period:

Notes: Graphing Quadratic Equations in Vertex Form

$$f(x) = a(x - h)^2 + k$$

Steps to Graph in Vertex Form

1. Identify the vertex (h, k)
2. choose 2 other x values, substitute into the equation to find y.
3. use axis of symmetry to reflect the points from step 2.

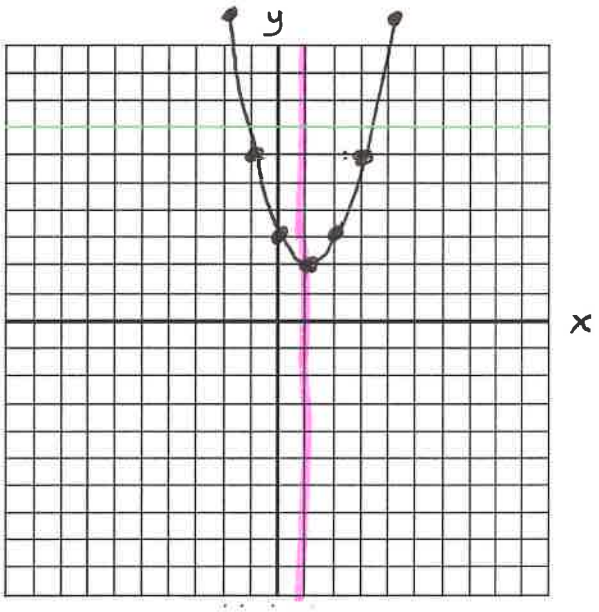
EXAMPLES: Use the steps listed above to graph the quadratic.

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

Axis of Symmetry: $x = 1$

Vertex: $(1, 2)$

x	work	y
-2	$(-2-1)^2+2$	11
-1	$(-1-1)^2+2$	6
0	$(0-1)^2+2$	3
1	$(1-1)^2+2$	2
2	$(2-1)^2+2$	3



(x)
Domain: all real #'s

Range: $y \geq 2$

(y)

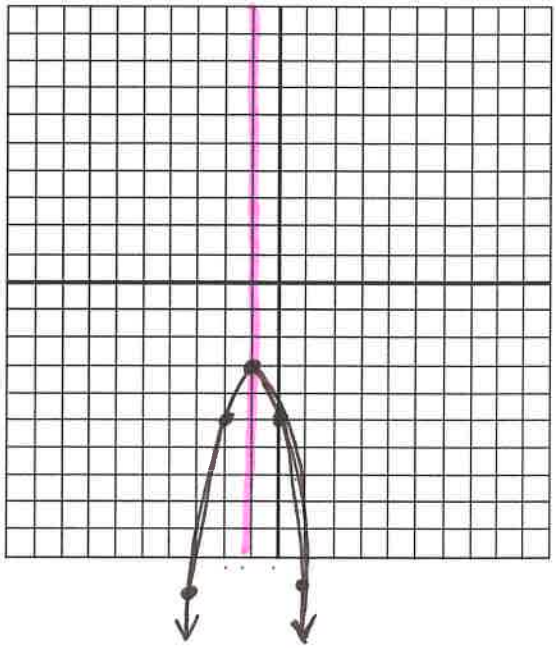
2. $f(x) = -2(x+1)^2 - 3$

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

Axis of Symmetry: $x = -1$

Vertex: $(-1, -3)$

x	y
-1	-3
0	$-2(0+1)^2 - 3 = -5$
1	$-2(1+1)^2 - 3 = -11$



Domain: all real #'s

Range: $y \leq -3$

(y)

You Try #1!!

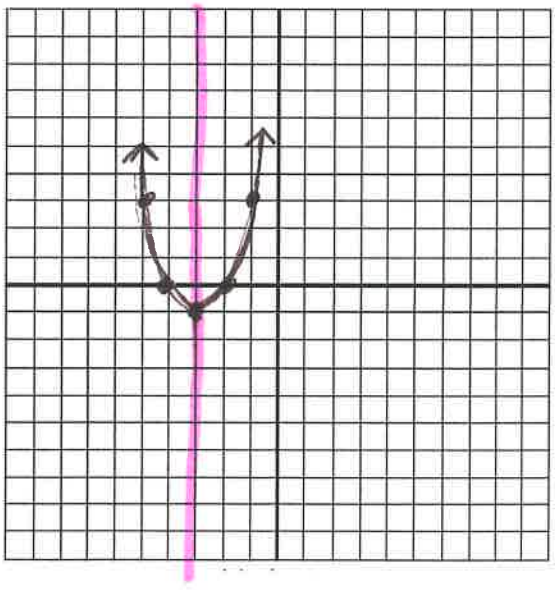
$f(x) = (x+3)^2 - 1$

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

Axis of Symmetry: $x = -3$

Vertex: $(-3, -1)$

x	y
-3	-1
-2	$(-2+3)^2 - 1 = 0$
-1	$(-1+3)^2 - 1 = 3$



Domain: all real #'s

Range: $y \geq -1$

(y)

You Try #2!!

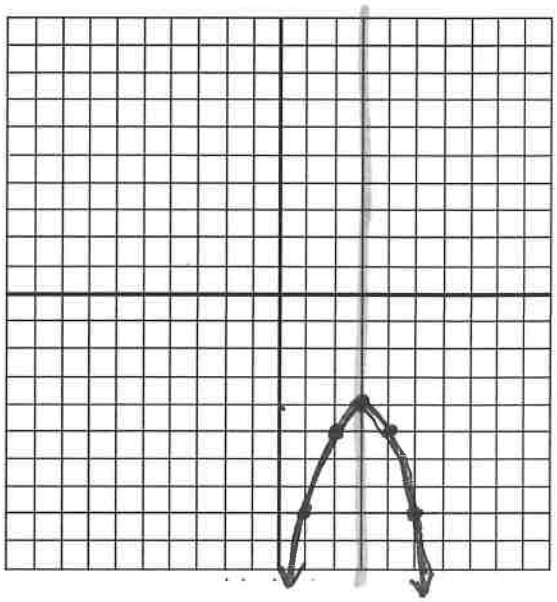
$f(x) = -(x-3)^2 - 4$

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

Axis of Symmetry: $x = 3$

Vertex: $(3, -4)$

x	y
1	$-(1-3)^2 - 4 = -8$
2	$-(2-3)^2 - 4 = -5$
3	-4



(x)

Domain: all real #'s

Range: $y \leq -4$

(y)

Intro to Vertex Form

$y = a(x-h)^2 + k$ vertex is (h,k)

How to identify h & K

$y = 3(\boxed{x-2}\,)^2 \boxed{+3}$

$y = 3(\boxed{x-h}\,) \boxed{+k}$

To identify h → figure out value of x that makes ( ) = 0

→ if $x-2 = x-h$

$-x \quad -x$

$-2 = -h$

$\frac{-2}{-1} = \frac{-h}{-1}$

$2 = h$

Don't need to do this but I am showing you why!

so $h = 2$ so $k = 3$

(h,k)

vertex: $(2,3)$

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

$h = -1 \quad k = 2$ → vertex: $(-1,2)$

why? $x-h = x+1$

$-x \quad -x$

$-h = 1$

$\frac{-h}{-1} = \frac{1}{-1}$

$h = -1$

Notice $(x+3)^2 \rightarrow (x-(-3))^2$

$(x-h)^2$

h

Other examples:

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

$h = -3 \quad k = -4$

vertex: $(-3,-4)$

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

$h = 4 \quad k = 2$

vertex: $(4,2)$

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

$h = 1 \quad k = 0$

vertex: $(1,0)$

$y = 3x^2 - 4$

$h = 0 \quad k = -4$

vertex: $(0,-4)$

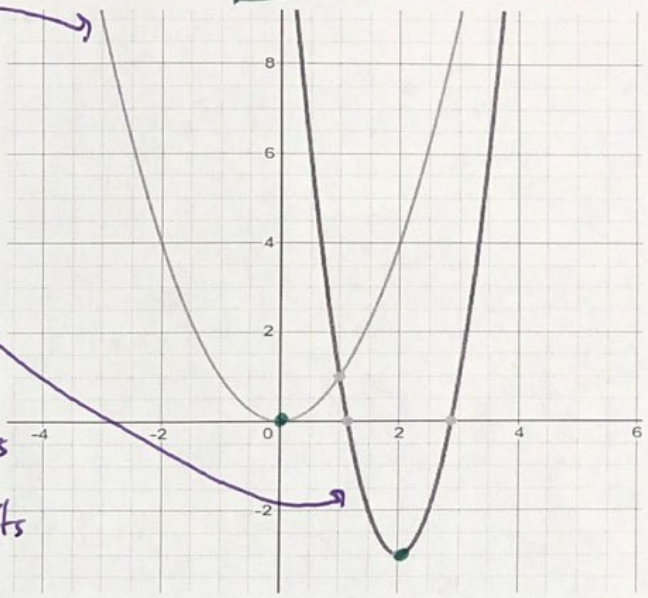
So... What you should start to notice is h is the opposite of what it looks like & K is what it looks like.

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

Describing Transformations of a Quadratic in Vertex Form – Graphed Visual Example

1. $y = x^2$ (Parent Function)

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



$a = 4$ → opens up, vertical stretch (skinny)

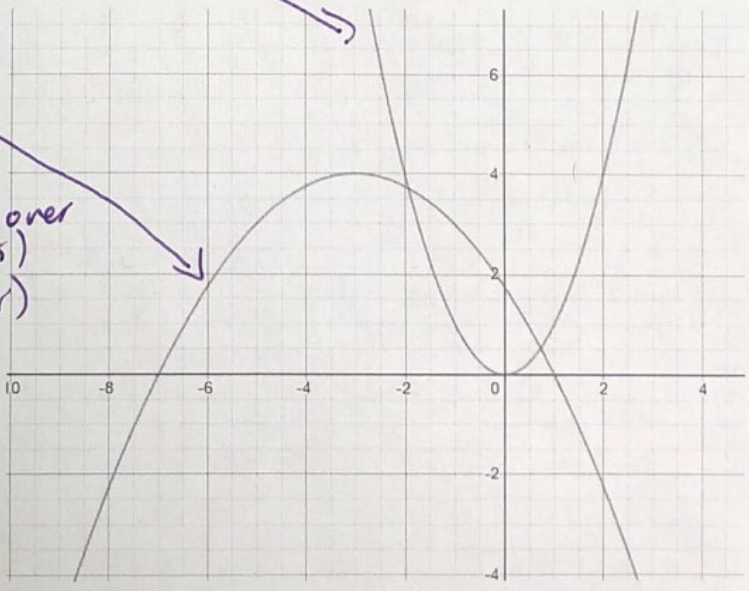
$h = 2$ → horizontal shift right 2 units

$k = -3$ → vertical shift down 3 units

So... for the parent function to become the new function it went right 2, down 3 and became skinnier.
(order of transformations does not matter)

1. $y = x^2$ (Parent function)

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



$a = -\frac{1}{4}$ → opens down (reflection over x-axis)
→ vertical shrink (wider)

$h = -3$ → horizontal shift left 3 units

$k = 4$ → vertical shift up 4 units

So... for parent function to become new function it was reflected over x-axis, became flatter, moved left 3 units and up 4 units.