GSE Algebra 1 **7.2 – notes** Name: _____

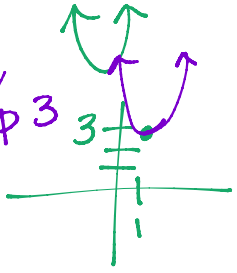
We are going to practice writing equations in vertex form using all different pictures.

Let's talk about how these have moved on the graph. Transformations

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

Right 1 up 3

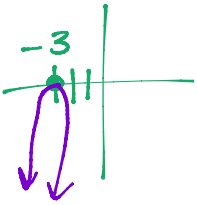
Vertex (1,3)



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

Reflect V. stretch left 3

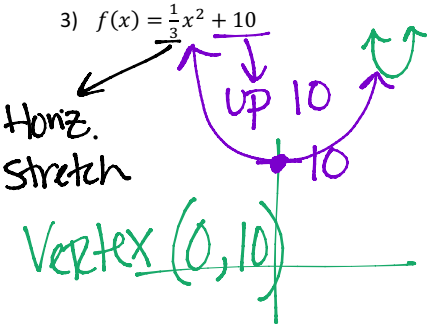
Vertex (-3,0)



3) $f(x) = \frac{1}{3}x^2 + 10$

Horiz. stretch up 10

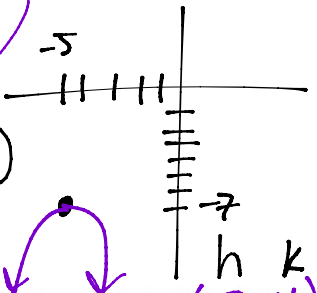
Vertex (0,10)



4) $f(x) = -(x+5)^2 - 7$

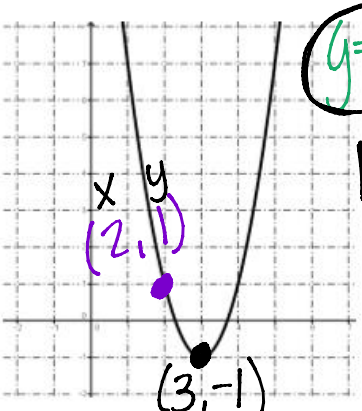
left 5 Down 7 Reflect

Vertex (-5,-7)



Let's make equations now given all different types. $y = a(x-h)^2 + k$

5)



x y

(2,1)

(3,-1)

h k

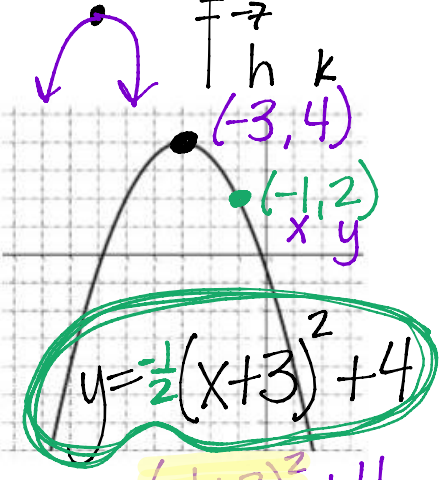
$y = 2(x-3)^2 - 1$

$1 = a(2-3)^2 - 1$

$1 = 1a - 1$

$+1 \quad +1$

$2 = a$



h k

(-3,4)

(-1,2)

x y

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

$2 = a(-1+3)^2 + 4$

$2 = 4a + 4$

$-4 \quad -4$

$\frac{-2}{4} = \frac{4a}{4}$ $a = -\frac{1}{2}$

7)

x	f(x)
-4	7
-3	2
-2	-1
-1 (h)	-2 (k)
0	-1
1 (x)	2 (y)
2	7
3	14
4	23

*a tricky part (use Algebra)

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

$2 = a(1+1)^2 - 2$

$2 = 4a - 2$

$+2 \quad +2$

$\frac{4}{4} = \frac{4a}{4}$ $a = 1$

8) The area of a square with side length x, where the side length is decreased by 3, the area is multiplied by 2 and then 4 square units are added to the area.

$l \cdot w = \text{Area}$

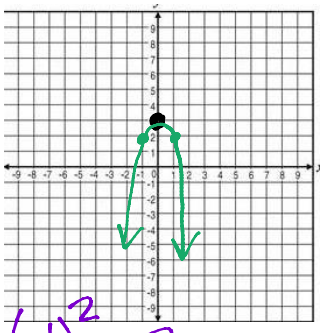
$(x-3)(x-3)$

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

Vertex: $(3, 4)$

Let's graph the following in vertex form based off the knowledge you have.

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



Reflect

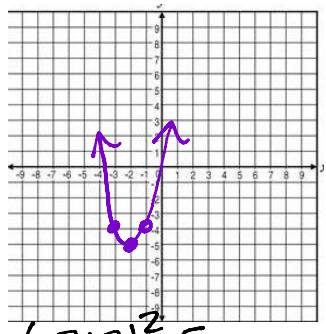
up 3

Vertex (0,3)

X	Y
-1	2 ←
0	3
1	2 ←

$-(-1)^2 + 3$ $-(1)^2 + 3$

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



left 2

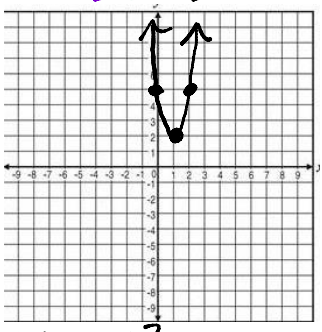
Down 5

Vertex (-2,-5)

X	Y
-3	-4
-2	-5
-1	-4

$(-3+2)^2 - 5$

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



V. stretch

Right 1

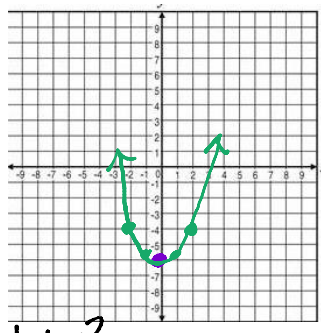
up 2

Vertex (1,2)

X	Y
0	5
1	2
2	5

$3(0-1)^2 + 2$

12) $f(x) = \frac{1}{2}x^2 - 6$



H. stretch

Down 6

Vertex (0,-6)

X	Y
-1	-5.5
0	-6
1	-5.5
2	-4

$\frac{1}{2}(-1)^2 - 6$

$\frac{1}{2}(2)^2 - 6$

1) $(x-3)^2$

std. form

$(x-3)(x-3)$

	X	-3
X		
-3		