

### 1.6 Quadratic Transformations

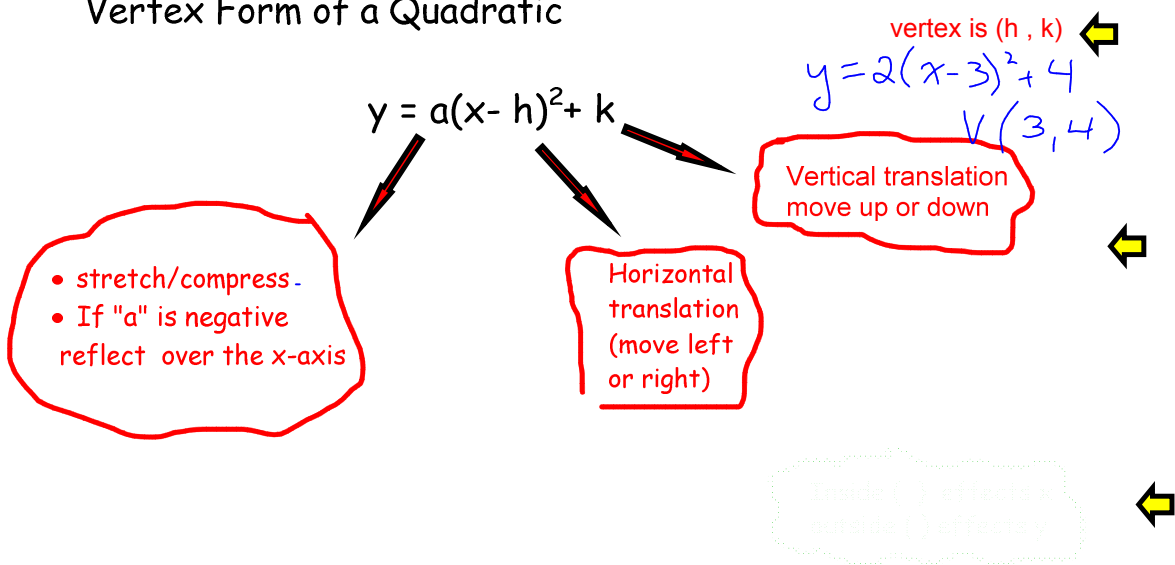
Transformations: are operations performed on functions to change the position or shape of the curves or lines

#### Putting it all together

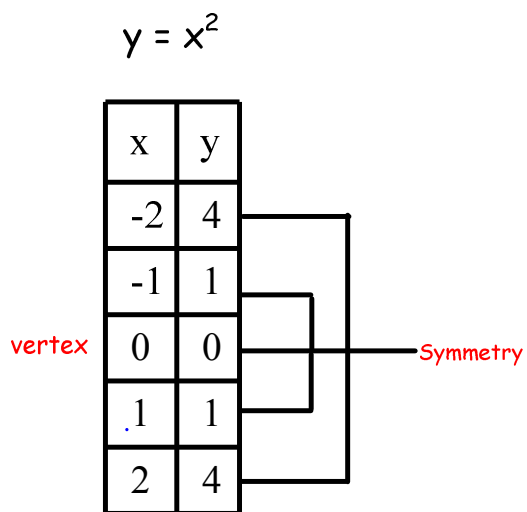
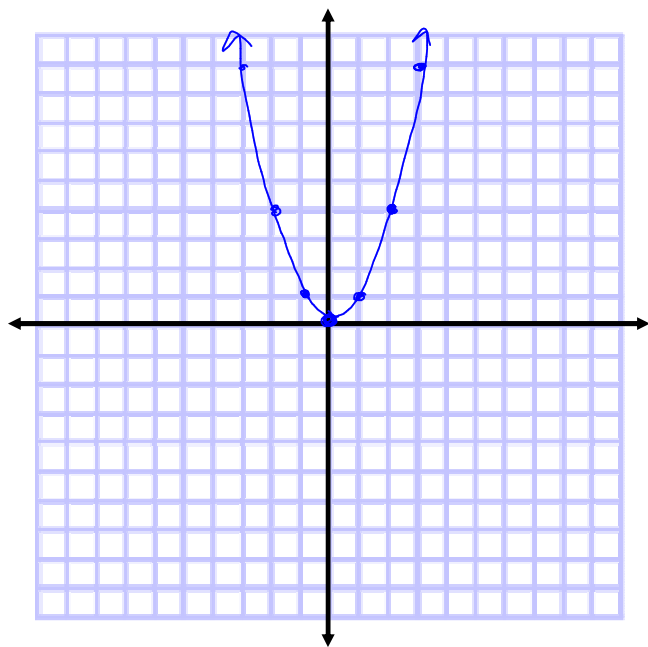
Compared to the graph in standard position  $y = x^2$

What did you notice from your investigation?

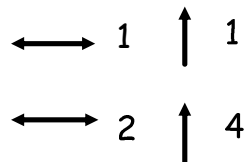
#### Vertex Form of a Quadratic



You will compare each of your transformed parabola to  
 $y = x^2$   
 graphed using 5 KEY points :



From the Vertex go...



Example: Graph each of the following

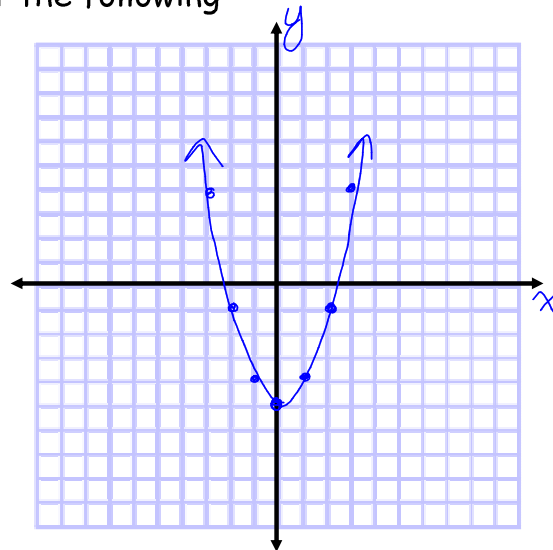
a)  $Y = x^2 - 5$   $V(0, -5)$

This is  $y=x^2$  moved **down** 5 units.

From the Vertex go...

$\longleftrightarrow 1$   $\uparrow 1$

$\longleftrightarrow 2$   $\uparrow 4$



b)  $Y = (x + 7)^2$   $V(-7, 0)$

eq'n

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

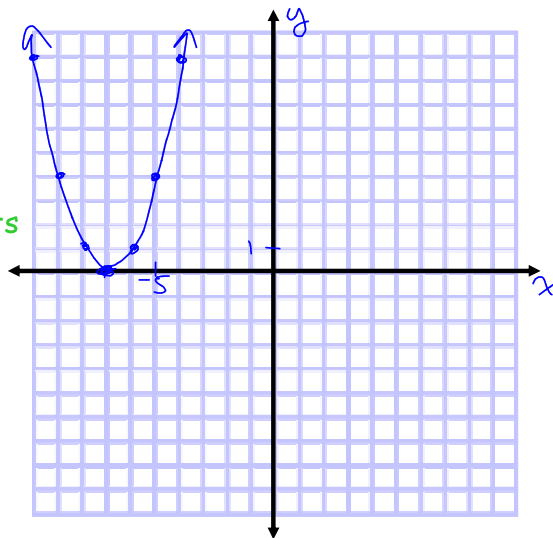
notice to get "+" in the brackets  
h is neg so here  $h = -7$   
(backwards in the brackets)

This is  $y=x^2$  moved **left** 7 units.

From the Vertex go...

$\longleftrightarrow 1$   $\uparrow 1$

$\longleftrightarrow 2$   $\uparrow 4$

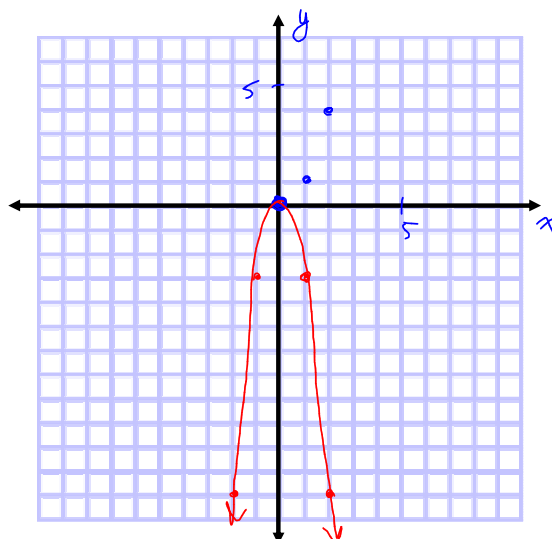


c)  $Y = -3x^2$   $V(0, 0)$

This is  $y=x^2$  reflected in the x axis  
and vertically stretched by 3

$\longleftrightarrow 1$   $\uparrow$  mult by "a"  
 $1 \times -3 = -3$

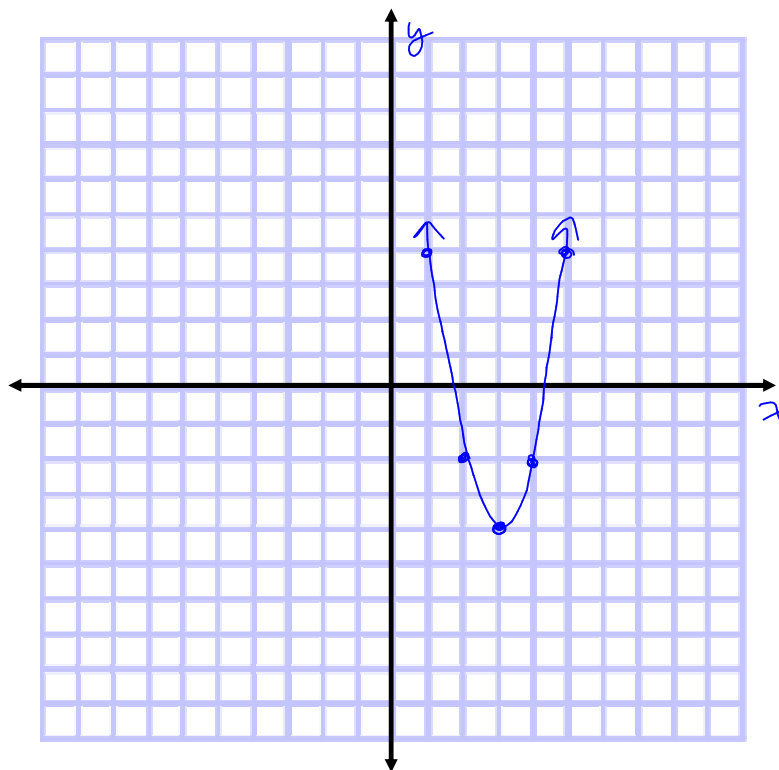
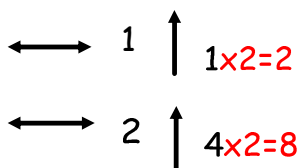
$\longleftrightarrow 2$   $\uparrow$   
 $4 \times -3 = -12$



$V(3, -4)$

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

vertex (3, -4)  
from the vertex  
plot points....



State the transformation:

- vertical stretch factor of 2
- horizontal shift right 3
- vertical shift down 4

When Stating Transformations

Order matters

**1st (multiplying operations)**

- Stretching
- Reflecting

**2nd (adding/subtracting operations)**

- Translations (left/right; up/down)



What if you can't see a h or k ie  $y = x^2$  ????

They are still .....there- you just don't write them

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



a      h      k

1. Quiz Time



2. HMWK

P47 # 1, 2(no table), 3, 4, 5-7 cd, (8 iv) abc

