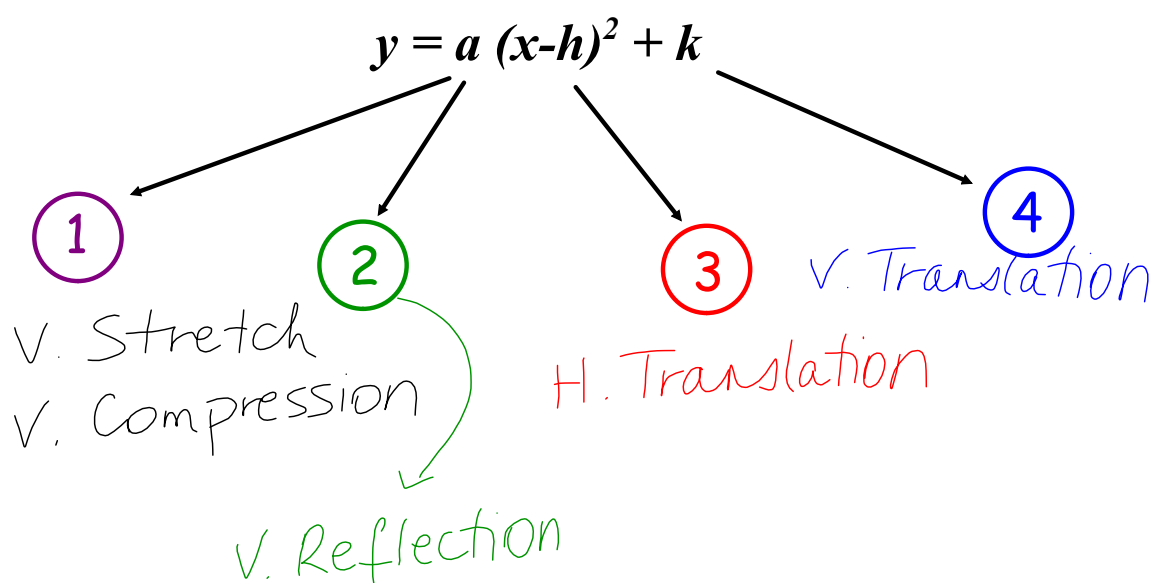


# TRANSFORMATIONS

## Learning Goals

- consolidate and practice transformations

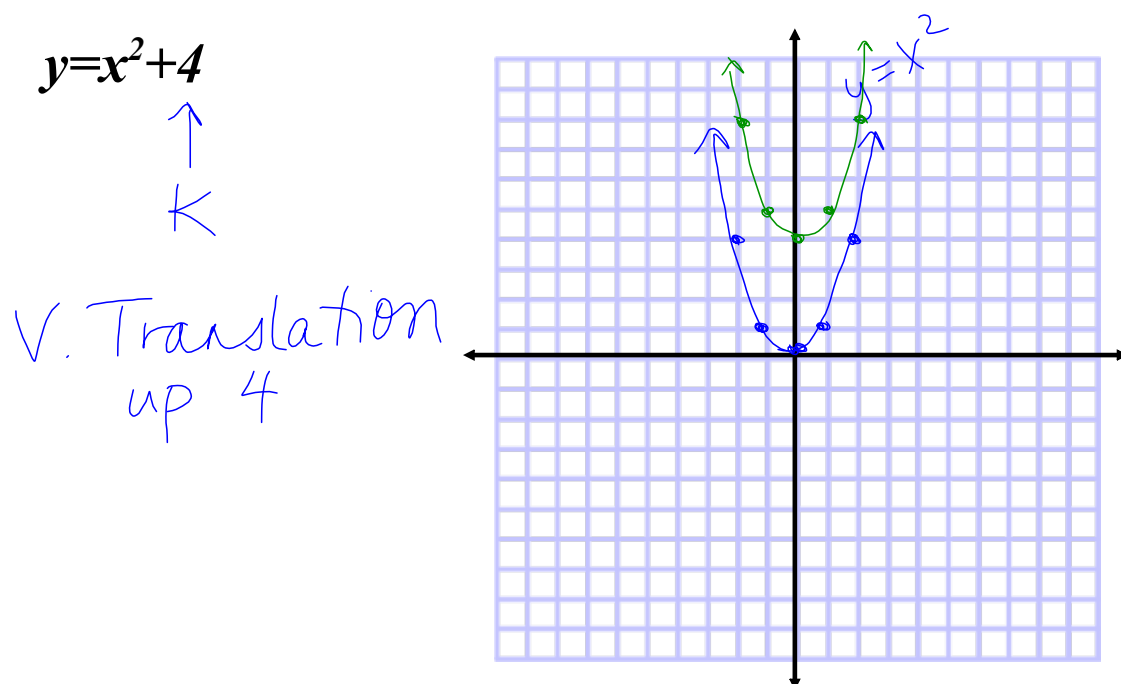
Parabolas can be transformed in four different ways:

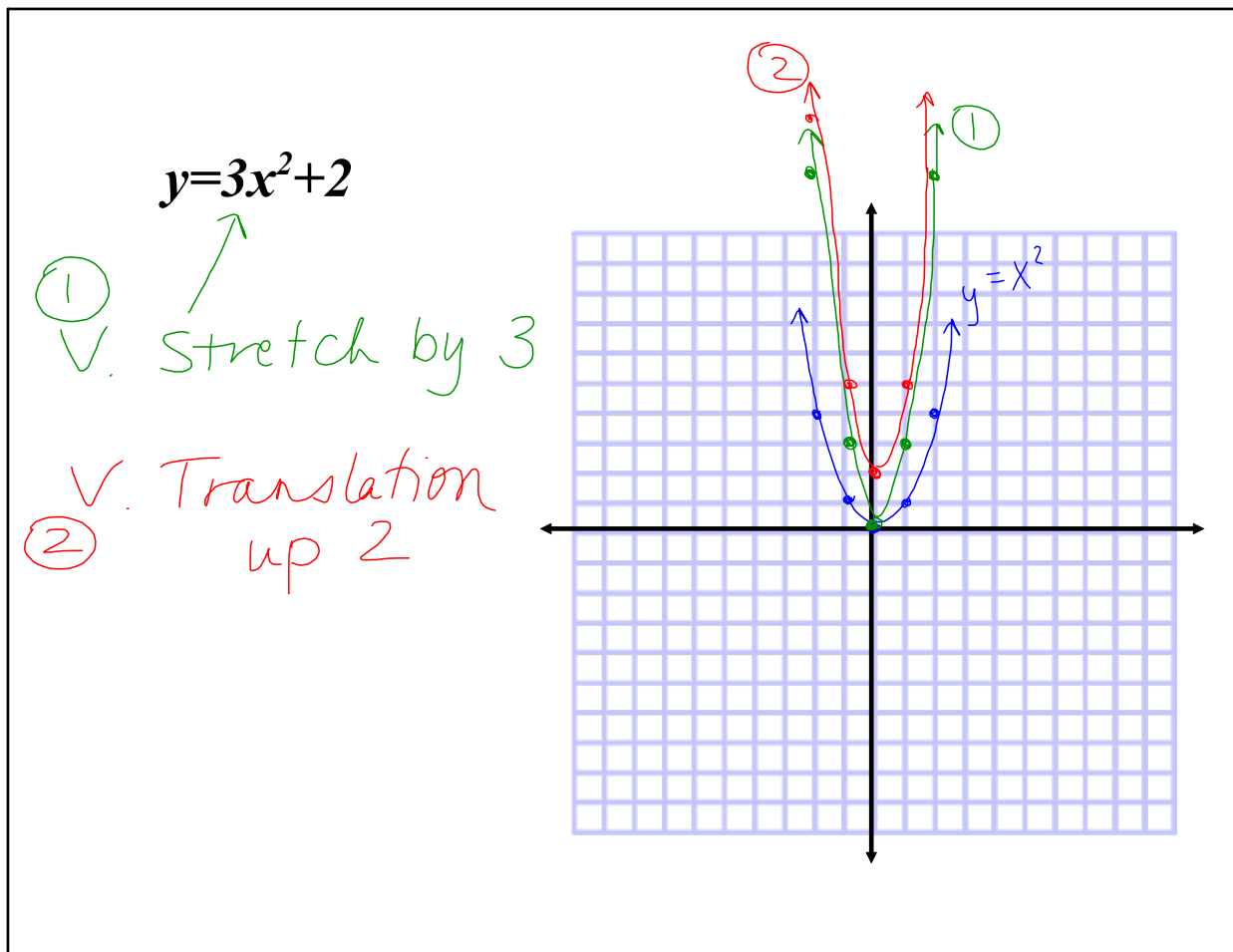


When we sketch the transformations

1. Reflections
2. Stretches / Compressions
3. Translations

Name transformations and sketch





Find the equation:

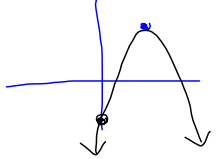
$y = a(x-h)^2 + k$   
 $y = -3(x-2)^2 + 5$

opens down -  
 v. stretch 3 -  
 vertex (2, 5)

opens up  
 congruent with  $y = 4x^2$   
 translated 5 units left

$y = +4(x+5)^2$

vertex (2, 3)  
y-int is -5



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

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

$$-5 = a(0 - 2)^2 + 3$$

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

$$-5 = a(4) + 3$$

$$-5 = 4a + 3$$

$$-8 = 4a$$

$$-2 = a$$

$$\therefore y = -2(x - 2)^2 + 3$$

translated 8 units left  $\Rightarrow (x + 8)$   
translated 5 units up

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

$$y = a(x + 8)^2 + 5$$

$$a = 1 \Rightarrow \text{original}$$

$$\therefore y = (x + 8)^2 + 5$$

### On the Boards...

Name transformations and sketch.

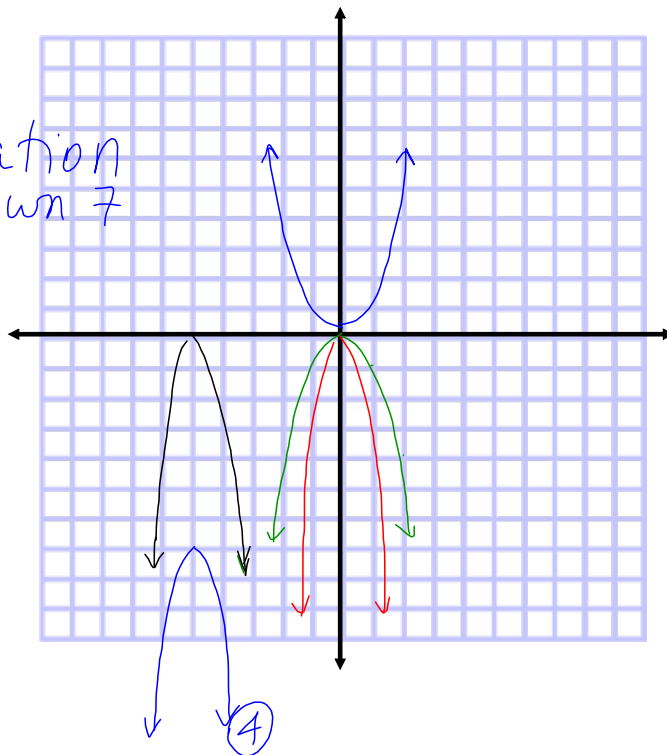
H. Translation  
left 5

V. Translation  
down 7

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

V. Reflection

V. Stretch by 2

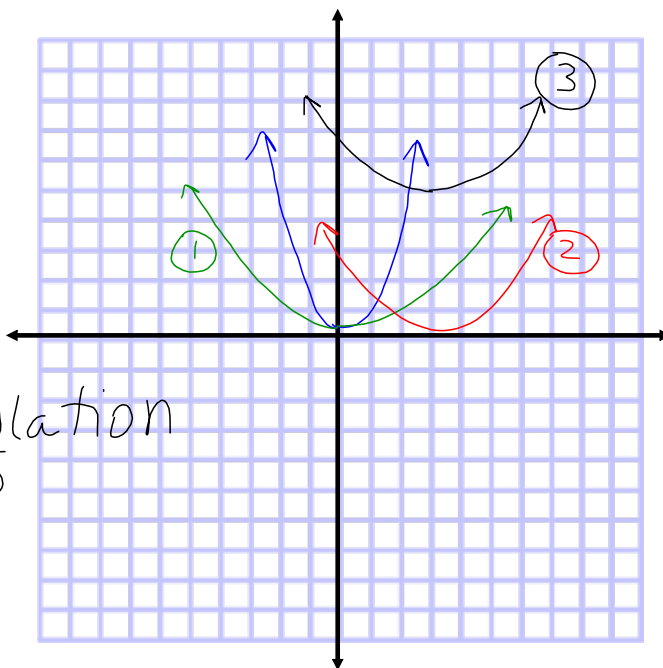


H. Translation  
right 3

$$y = 0.5(x-3)^2 + 5$$

V. Translation  
up 5

V. Compression



reflected in the x-axis ①

translated down 10 units ②

$$y = -1(x)^2 - 10$$

v. stretch of 2 ①

translated right 3 units ②

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

Seatwork / Homework

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