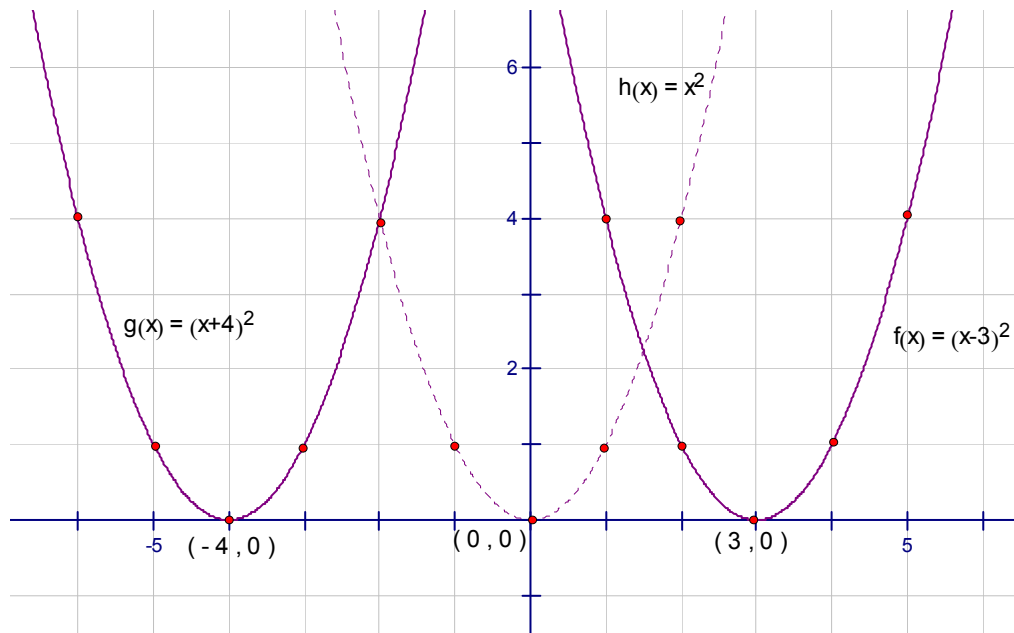


Unit: Transformations of Quadratic Topic: Vertical and Horizontal Translations

✚ *homework check:* Principles of Mathematics 10 p. 256 # 1, 2, 4, 5, 7, 8, 11

✚ *note:* Vertical and Horizontal Translations

Horizontal and vertical translations are controlled by the 'h' and 'k' in the quadratic equation  $y = a(x - h)^2 + k$ . The 'h' controls the horizontal translations and the 'k' controls the vertical translations. For example, compare the graphs below.



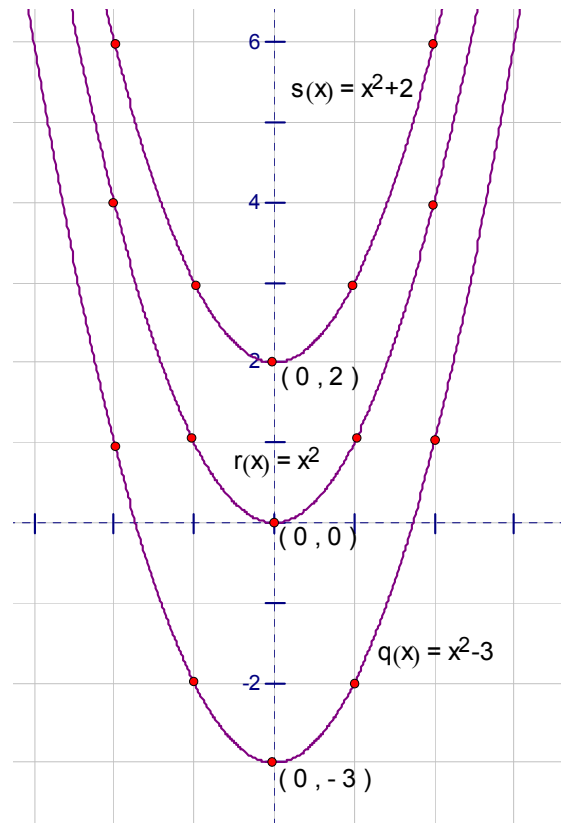
How are the graphs similar?

How are the graphs different?

How is the direction of translation related to the equation?

We describe these transformations saying that  $y = (x - 3)^2$  is a horizontal translation right 3 in the equation and a horizontal translation left 4 in the equation  $y = (x + 4)^2$ . Therefore, the 'h' in the function  $y = a(x - h)^2 + k$ , controls the horizontal translations. If 'h' is negative, the movement is right and if the 'h' is positive, the movement is left (\* brackets work backwards).

Compare each of the following graphs.



How are the graphs similar?

How are the graphs different?

How is the direction of translation related to the equation?

We describe these transformations as a vertical translation down 3 in the equation  $y = x^2 - 3$  and a vertical translation up 2 in the equation  $y = x^2 + 2$ .

The vertex of any quadratic will be located according to any horizontal and vertical movement, therefore, the vertex is at  $(h, k)$ .

**📌 homework assignment: Principles of Mathematics 10 p. 262 # 1 – 5**