

Transformations Unit

I can transform functions and explain the motion.

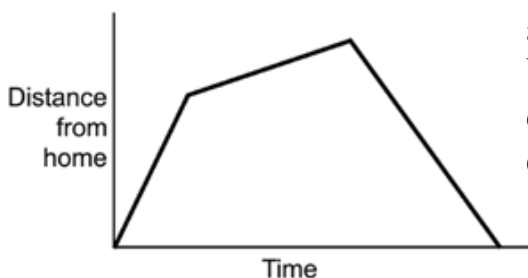
I can graph equations that have been transformed.

I can write the equations of graphs.

Today: Translations with the QUADRATIC family

Stick Quiz

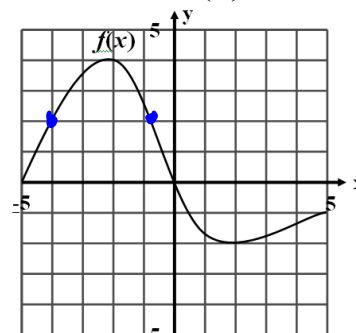
1. Tell a story for the graph.



3. Given this graph of the function $f(x)$, find:

- a. $f(-4) = 2$
- b. $f(0) = 0$
- c. $f(-5) = 0$
- d. x when $f(x) = 2$

-4 -0.8



2. Evaluate the following expressions given the functions.

$$f(x) = x^2 + 7 \qquad h(x) = \frac{12}{x}$$

a. $h(24) = \frac{1}{2}$

b. $2 + f(3) = 18$

c. Find x if $f(x) = 23$ $x = 4$ $x = -4$

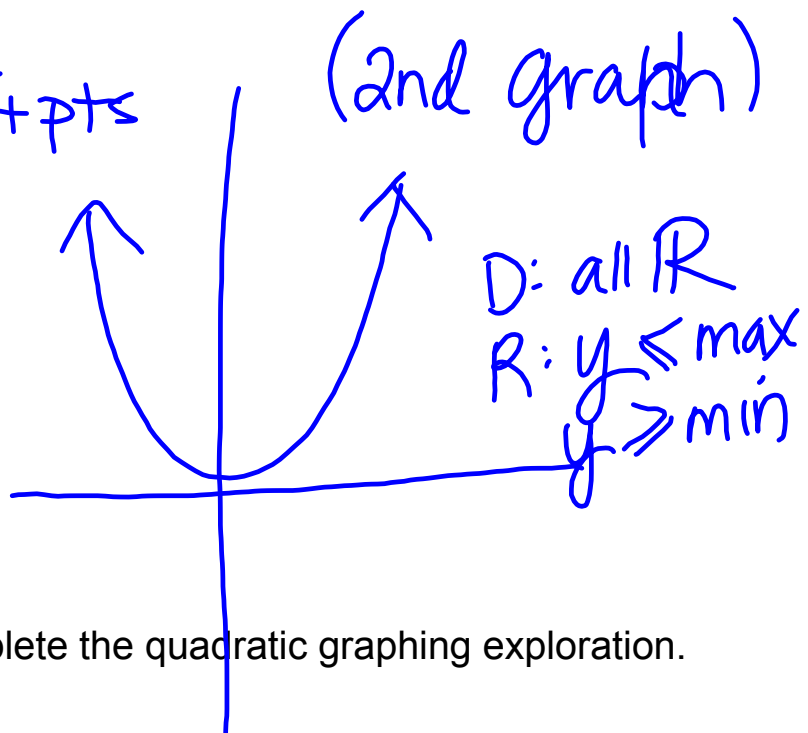
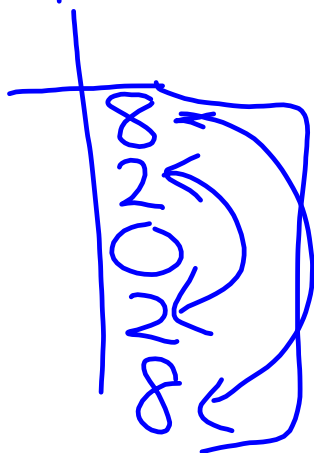
$$23 = x^2 + 7$$

$$\sqrt{16} = \sqrt{x^2}$$

$$x = \pm 4$$

Translation Moving a graph horizontally or vertically

- make a table
- graph 5 exact pts



In pairs complete the quadratic graphing exploration.

Horizontal moves (translations) are in parenthesis with the x value.
Vertical moves (translations) are just added to the end.

INSIDE

OUTSIDE

This is for some generic function $f(x)$

Given the graph $y = f(x)$, the graph of

$$y = f(x - h) + k$$

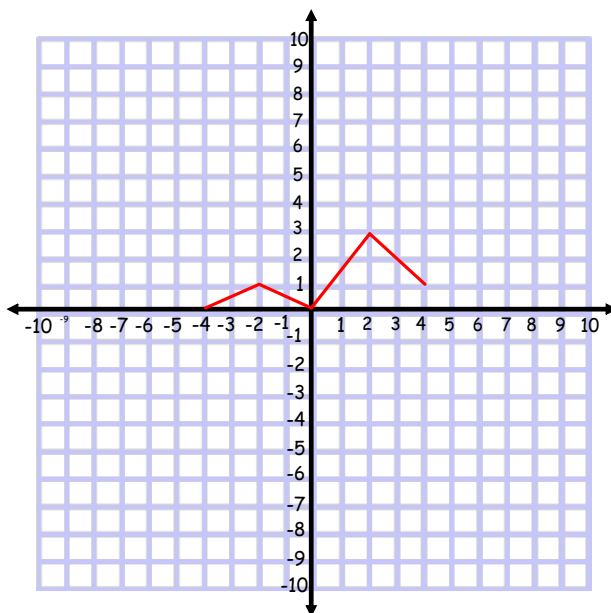
or

$$y = k + f(x - h)$$

is a translation horizontally h units and vertically k units

Let's practice...

$y = f(x)$

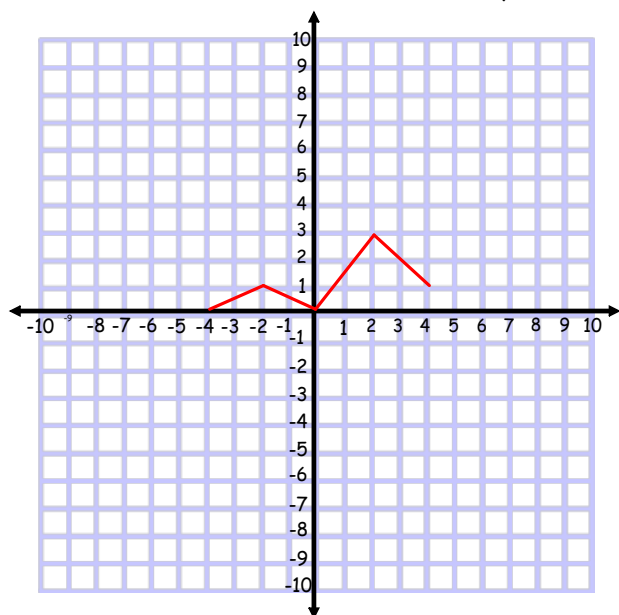


Find...

- 1) $y = f(x - 8)$
- 2) $y = f(x) + 3$
- 3) $y = f(x - 1) + 2$
- 4) $y = f(x - 5) - 4$
- 5) $y = f(x + 5) - 9$
- 6) $y = f(x - 8) + 7$
- 7) $y = f(x + 7) + 4$
- 8) $y = f(x + 9) + 9$
- 9) $y = f(x + 9) - 3$
- 10) $y = f(x - 7) - 6$

$y = f(x)$

Now, I'll move the graph and you write the equation!



The Quadratic Family of Functions

The parent function $y = x^2$

Relatives are all of the quadratics -
look for something **squared!**



Quadratic Family

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

$$7x = x^2$$

$$f(x) = 5x^2$$

$$y = 3x^2 - 4x + 7$$

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

NOT the Quadratic Family

$$y = (x + 7) + 4$$

$$7x = x^3$$

$$f(x) = \sqrt{5x}$$

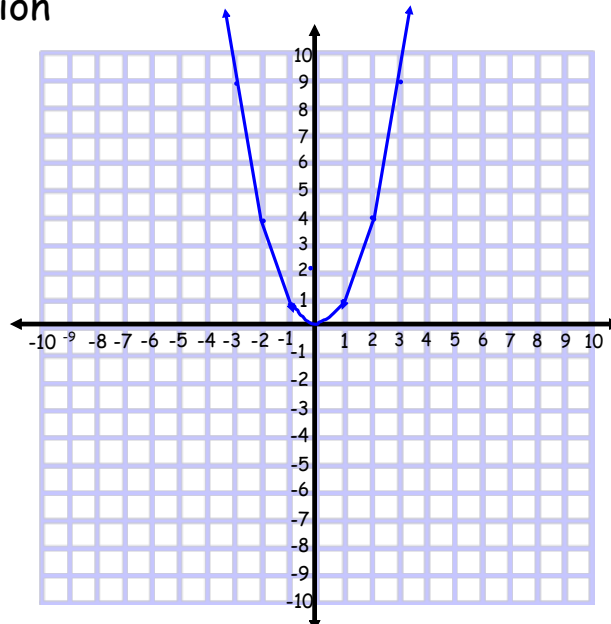
$$y = |x + 7|$$

$$y = 5$$

Parent Function

$$y = x^2$$

Table method
Cheer method



domain: all real #'s
range: all real #'s ≥ 0

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

$$f(x) = 1(x - h)^2 + k$$

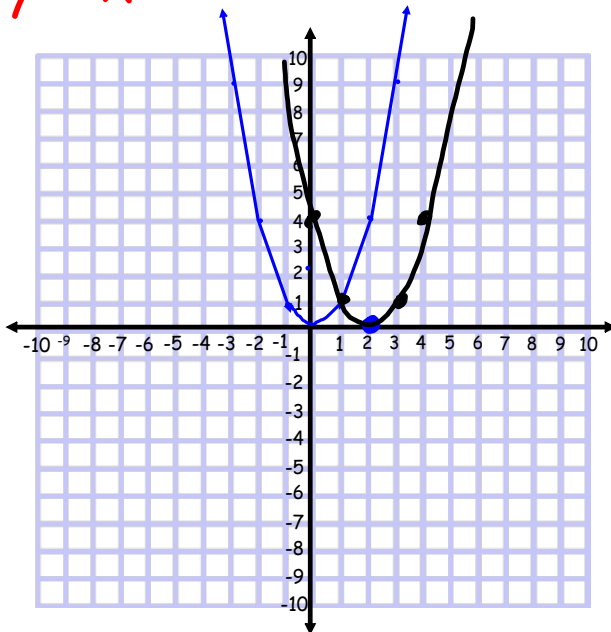
$$y = k + 1(x - h)^2$$

This is the VERTEX form of a quadratic, the vertex is (h, k).

In this form the y-intercept is not visible.

Let's do some shifting! State the domain and range.

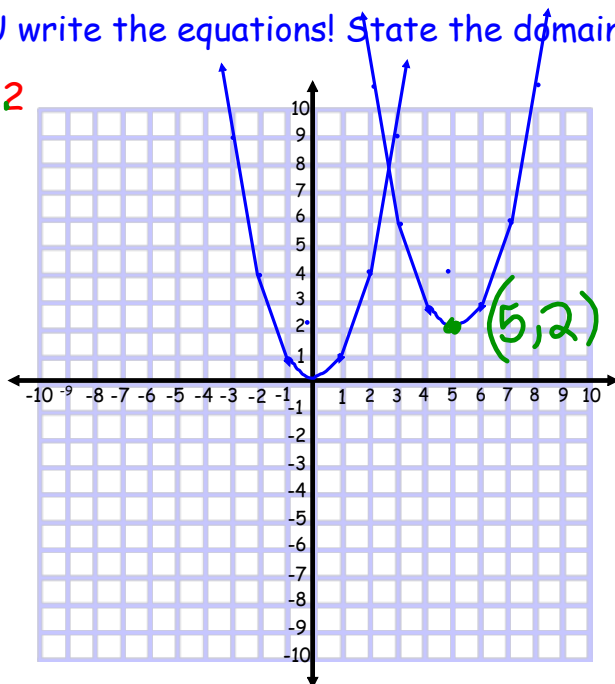
$$y = x^2$$



- 1) $y = (x - 2)^2$ (2, 0)
- 2) $y = (x)^2 + 5$ (0, 5)
- 3) $y = (x - 4)^2 + 3$
- 4) $y = (x + 2)^2 - 6$
- 5) $y = (x - 9)^2 + 9$
- 6) $y = (x)^2 - 10$
- 7) $y = (x + 10)^2 + 1$
- 8) $y = (x + 5)^2 - 8$
- 9) $y = (x^2 + 6) - 3$

Now YOU write the equations! State the domain and range.

$$y = x^2$$



right 5 h
up 2 k

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

↑ ↑

Homework

Quadratic Translations

WS#2