

9/29 Notes

AZ

DOB: ~~2m~~ 3ab, 4ab, 4cd

Topic: 4.5 square roots & reflection

Transformations

- work the same as x^2 equations

$$y = \sqrt{x-h} + k$$

$h > 0$ then the graph moves right

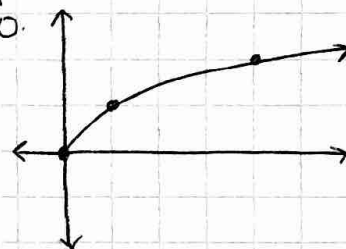
$h < 0$ then the graph moves left

$k > 0$ the graph moves up

$k < 0$ the graph moves down

$$y = \sqrt{x}$$

must be ≥ 0 .



Reflections

$y = -f(x)$ flip over x-axis, change sign of y-values

$y = f(-x)$ flip over y-axis, change sign of x-values

In-class

4.5 investigation

* on calculator $f(x) \sim Y_1$ *

HW 20

4.5 Investigation: Take a Moment to Reflect

In this investigation you first will work with linear functions to discover how to create a new transformation—a **reflection**. Then you will apply reflections to quadratic functions and square root functions. Sketch your graphs on the grids.

Step 1 Graph $f_1(x) = 0.5x + 2$ on your calculator.

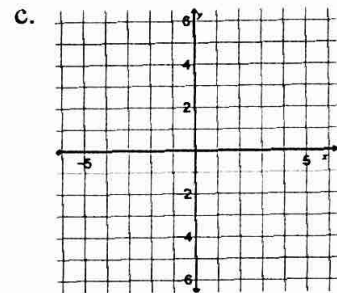
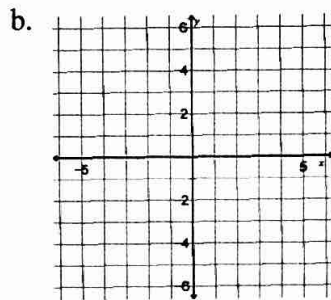
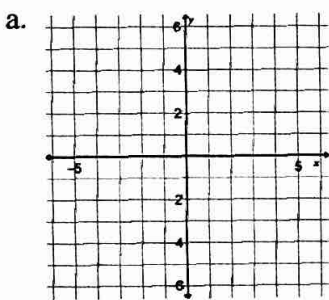
a. Make a sketch to predict what the graph of $-f_1(x)$ will look like.

Then check your prediction by graphing $f_2(x) = -f_1(x)$.

b. Change f_1 to $f_1(x) = -2x - 4$, and repeat the instructions in Step 1a.

c. Change f_1 to $f_1(x) = x^2 + 1$ and repeat.

To get $f_2(x) = -f_1(x)$, select the double arrow at the lower left corner (Show Entry Line), type the negative sign, then use the keyboard to type f, 1, parenthesis, x.



d. In general, how are the graphs of $y = f(x)$ and $y = -f(x)$ related?

Step 2 Graph $f_1(x) = 0.5x + 2$ on your calculator.

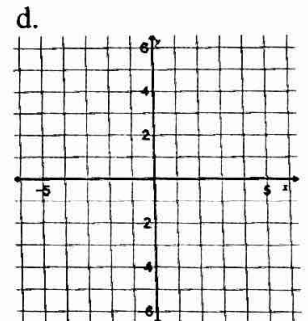
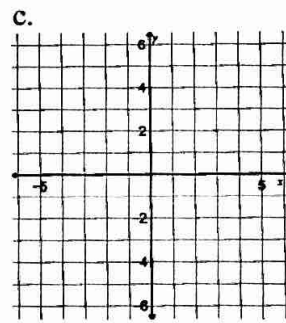
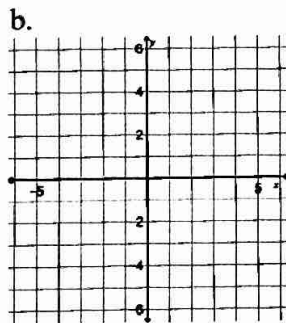
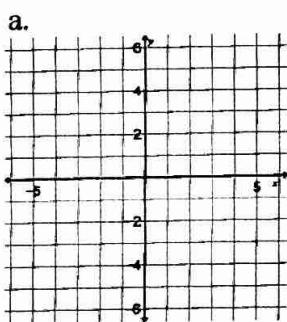
a. Make a sketch to predict what the graph of $f_1(-x)$ will look like.

Then check your prediction by graphing $f_2(x) = f_1(-x)$

b. Change f_1 to $f_1(x) = -2x - 4$, and repeat the instructions in Step 1a.

c. Change f_1 to $f_1(x) = x^2 + 1$ and repeat. Explain what happens.

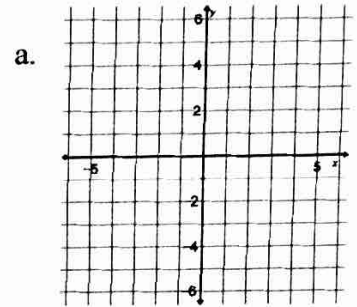
d. Change f_1 to $f_1(x) = (x - 3)^2 + 2$ and repeat.



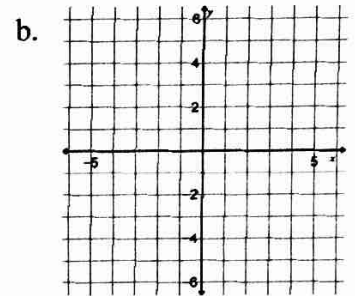
e. In general, how are the graphs of $y = f(x)$ and $y = f(-x)$ related?

Step 3 Graph $f_1(x) = \sqrt{x}$ on your calculator.

a. Make a sketch to predict what the graphs of $f_2(x) = -f_1(x)$ and $f_3(x) = f_1(-x)$ will look like. Use your calculator to verify your predictions. Write equations for both of these functions in terms of x .



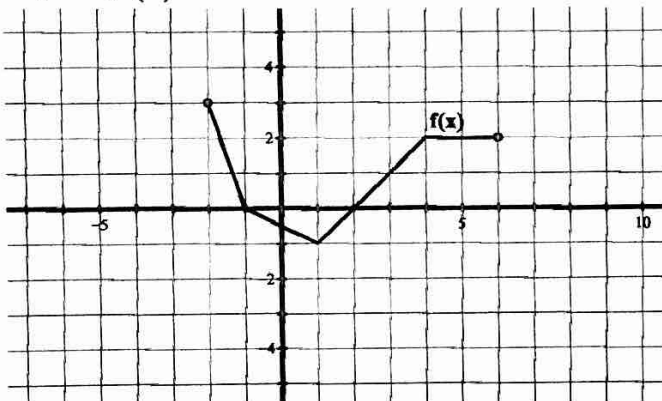
b. Make a sketch to predict what the graph of $f_4(x) = -f_1(-x)$ will look like. Use your calculator to verify your prediction.



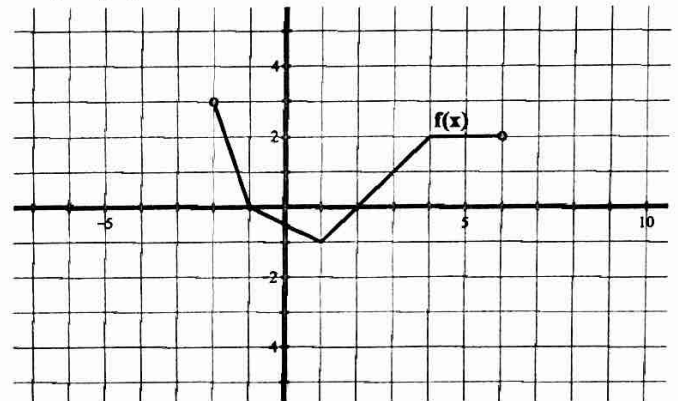
c. Notice that the graph of the square root function looks like half of a parabola, oriented horizontally. Why isn't it an entire parabola? What function would you graph to complete the bottom half of the parabola?

Step 4 Given the graph of $f(x)$, sketch each of these related functions.

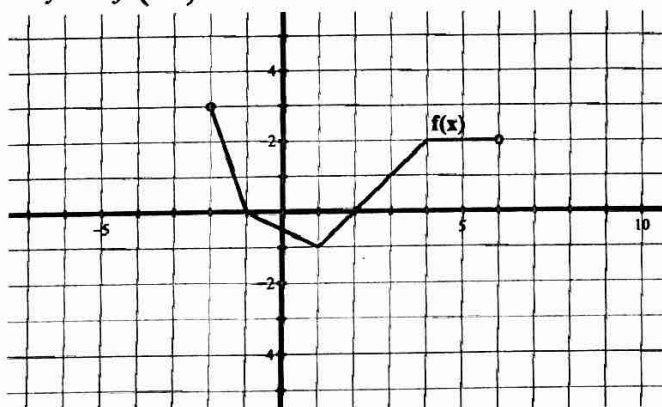
a. $y = -f(x)$



b. $y = f(-x)$



c. $y = -f(-x)$



d. $y = -f(x-2)$

