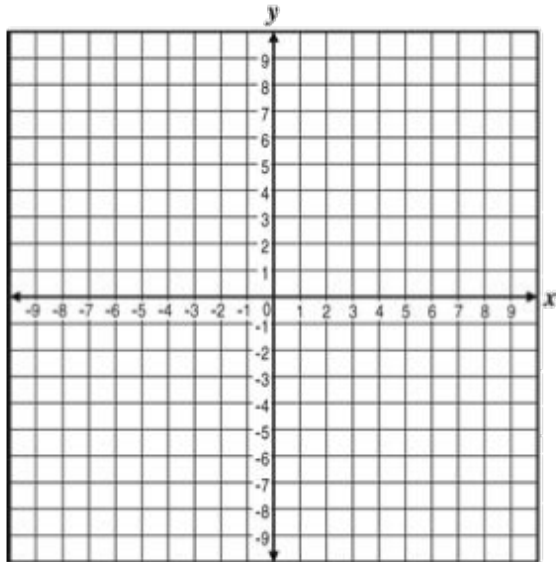


**Chapter 2.5: Transformations of Functions**

Complete these notes as you work through the Desmos activity.  
<https://teacher.desmos.com/activitybuilder/custom/615f46d974710854e75d39e0>

Slide 1: Graph the parent function for  $y = \sqrt{x}$  on the coordinate plane below. We will be using this function to explore transformations of functions. List the parent points in the blank space to the right of the graph.



Slide 2: What do you notice about what a, h, and k do to the graph of the parent function?

a	
h	
k	

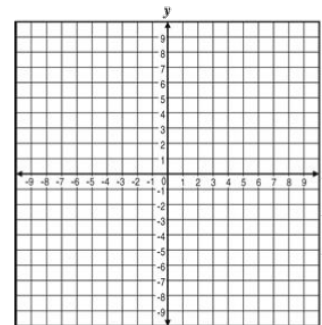
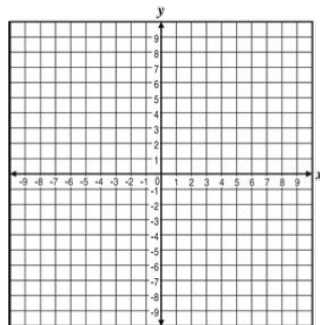
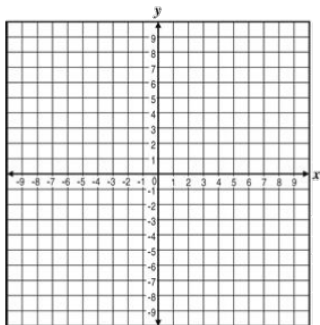
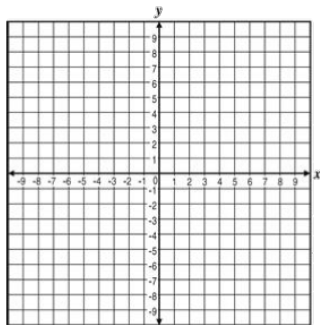
Slide 3: When you move the “a” slider to 2, 4, 7, and 1/2 you have now graphed the functions below respectively. Describe what happens to the parent function when you changed the “a” slider. Be specific about what changed within the points. Then graph the functions below.

$$f(x) = 2\sqrt{x}$$

$$f(x) = 4\sqrt{x}$$

$$f(x) = 7\sqrt{x}$$

$$f(x) = \frac{1}{2}\sqrt{x}$$

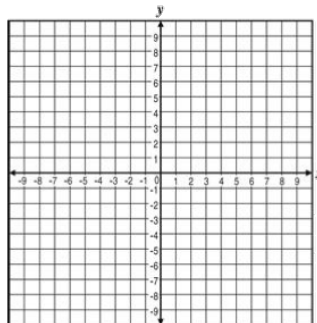
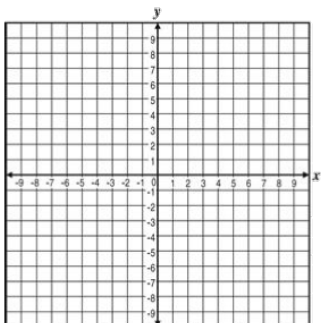


Slide 4: Summarize what you've learned about "a" in your own words.

Slide 5: When you move the "h" slider to 4 and then -6 you have now graphed the functions below respectively. Describe what happens to the parent function when you changed the "h" slider. Be specific about what changed within the points. Then graph the functions below.

$$f(x) = \sqrt{x - 4}$$

$$f(x) = \sqrt{x + 6}$$

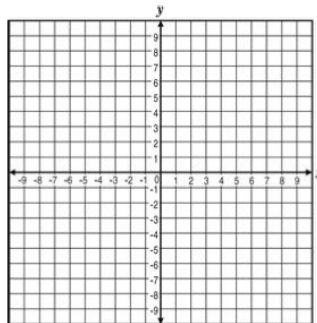
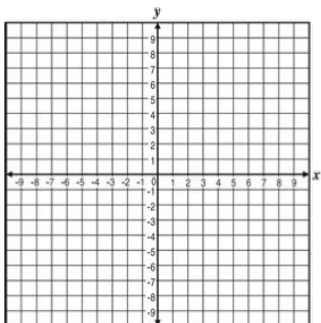


Slide 6: Summarize what you've learned about "h" in your own words.

Slide 7: When you move the "k" slider to 5 and then -3 you have now graphed the functions below respectively. Describe what happens to the parent function when you changed the "k" slider. Be specific about what changed within the points. Then graph the functions below.

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

$$f(x) = \sqrt{x} - 3$$



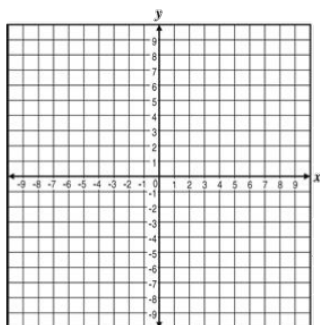
Slide 8: Summarize what you've learned about "k" in your own words.

Slide 9: Card Sort! Match the function with the transformations. Write your results below!

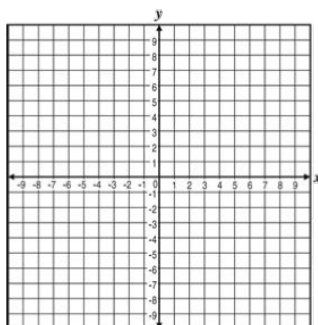
	Match 1	Match 2	Match 3	Match 4	Match 5
Function					
Transformations					

Slide 10: Graphing on your own!

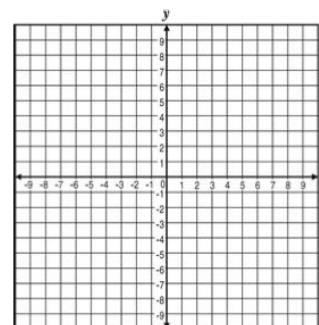
$$f(x) = 3\sqrt{x + 6}$$



$$f(x) = \sqrt{x - 4} - 7$$



$$f(x) = \frac{1}{2}\sqrt{x} + 5$$



Slide 11: What happens to the square root function when the negative is added to the front? How would you describe the transformation?

Slide 12: What happens to the square root function when the negative is added inside of the function? How would you describe the transformation?

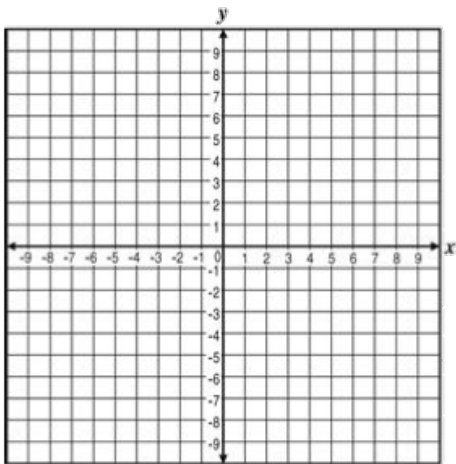
Slide 13: Summarize what you learned about negatives in your own words.

Slide 14: Card Sort!

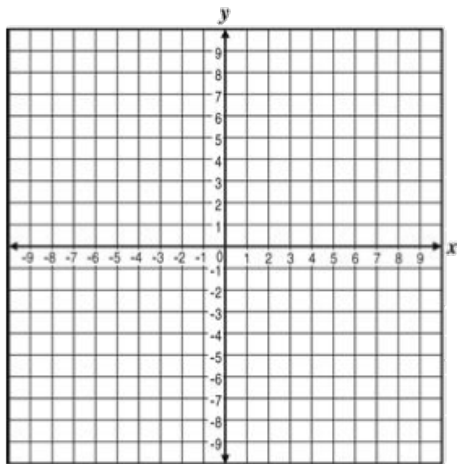
Slide 15: How does the graph change as the value of b changes?

Slide 16: When you move the “b” slider to 2, 3, and 0.5 you have now graphed the functions below respectively. Describe what happens to the parent function when you changed the “b” slider. Be specific about what changed within the points (look at the x values). Then graph the functions below.

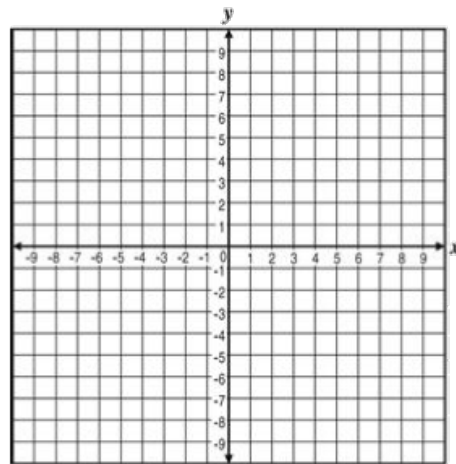
$$f(x) = \sqrt{2x}$$



$$f(x) = \sqrt{3x}$$



$$f(x) = \sqrt{\frac{1}{2}x}$$



Slide 17: Summarize what you learned about b in your own words.

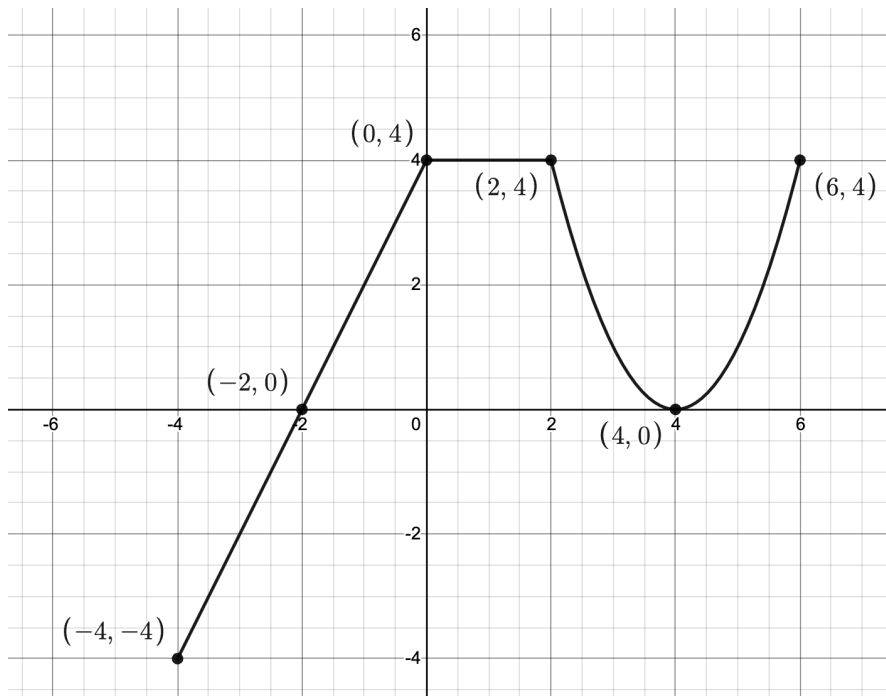
This is the end of the partner exploration part of the activity. We will continue the rest of the notes as a class.

**Transformations of Function Rules**

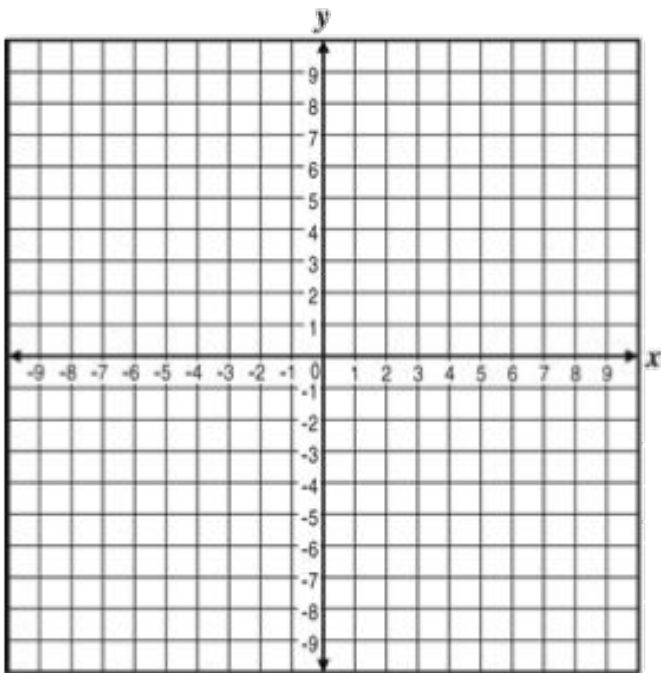
If  $f(x)$  is a function, then

$$y = af(b(x - h)) + k$$

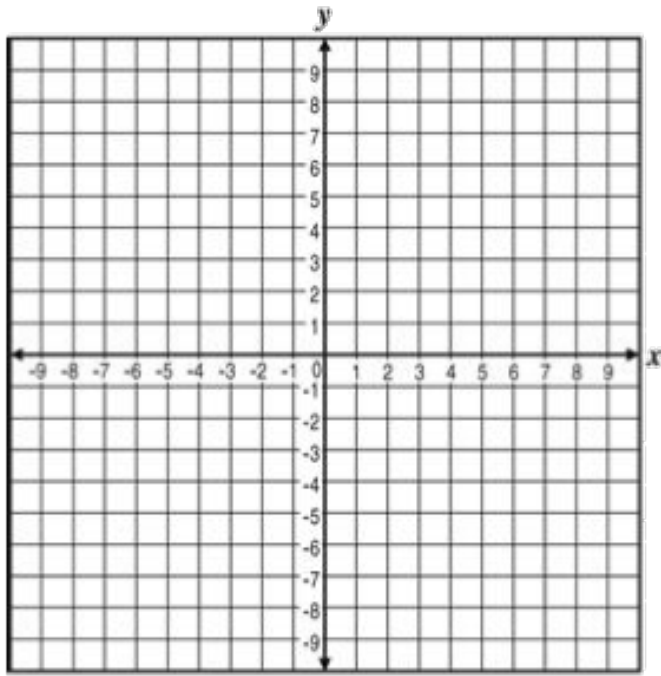
**Ex. 1** The function  $f(x)$  is graphed below. List the transformations being done to the parent and then graph  $g(x)$ .



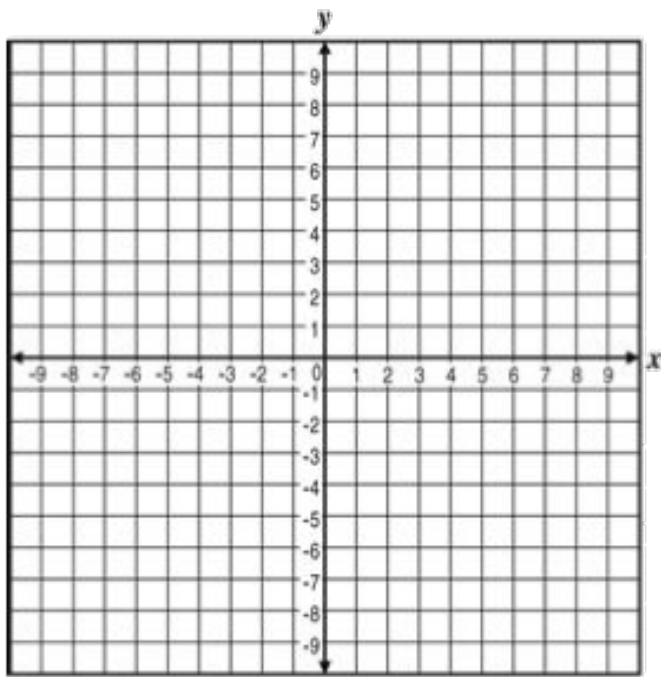
a)  $g(x) = f(2x)$



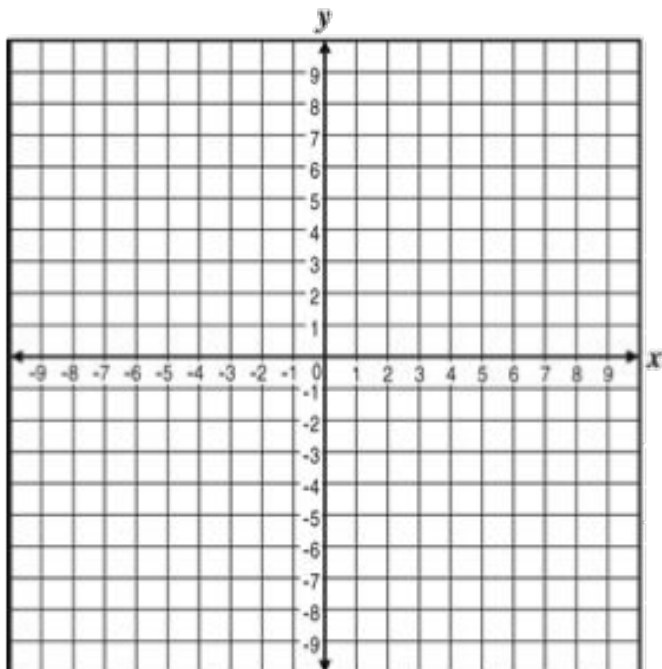
b)  $g(x) = 3f(x)$



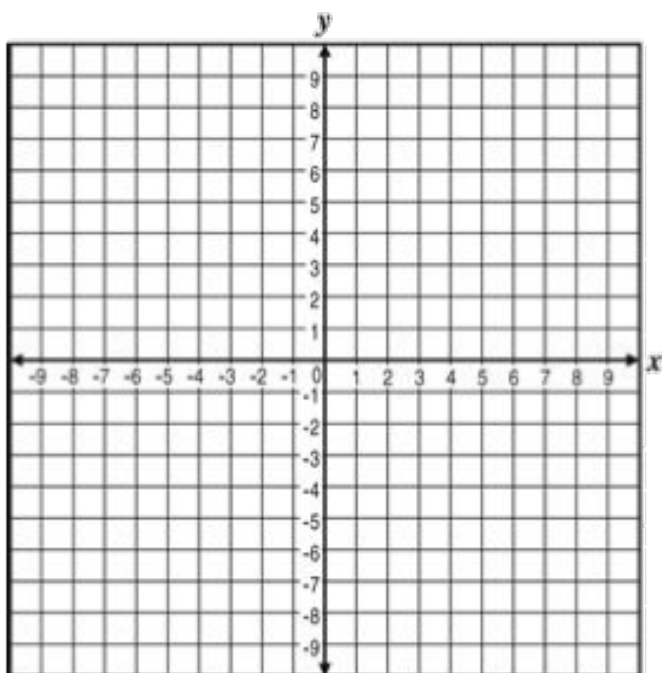
c)  $g(x) = f(x - 5) + 3$



d)  $g(x) = -f(x + 6)$



e)  $g(x) = 2f(-x) + 5$



f)  $g(x) = f(4x + 8)$

