CW#____ Name:______________________

Period: A1 A2 A3 B1 B3

5.1.2 How can I determine an inverse?

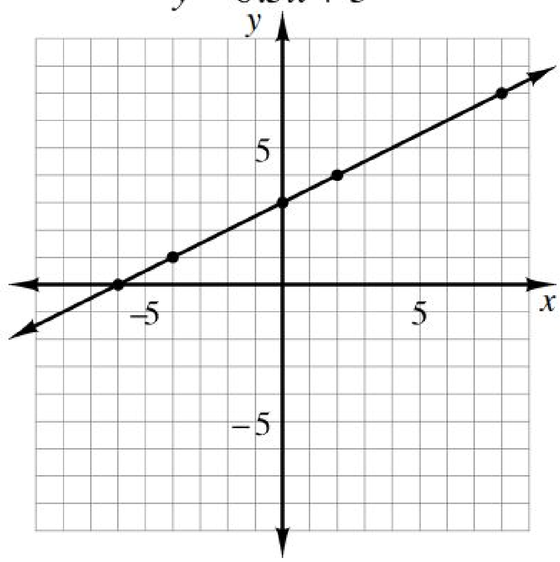
Using a Graph to Determine an Inverse

#15

a. Make a careful graph of each function’s inverse on the same set of axes as its corresponding function. Look for a way to make the graph without determining the equation of the inverse first. Be prepared to share your strategy with the class.

Original Inverse

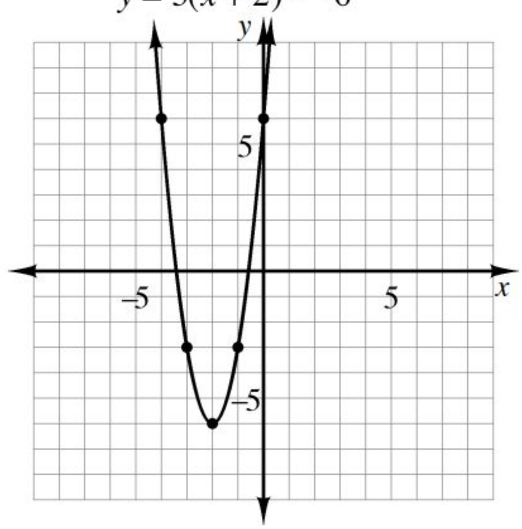
$y = 0.5x + 3$



Is the inverse a function?

Original Inverse

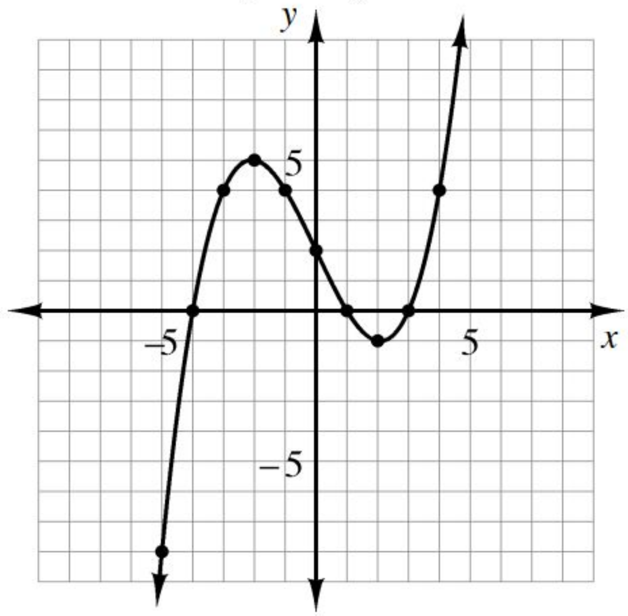
$y = 3(x+2)^2 - 6$



Is the inverse a function?

Original Inverse

$$y = \frac{1}{6}x^3 - \frac{13}{6}x + 2$$



Is the inverse a function?

b. Describe the relationship between the coordinates of a function and the coordinates of its inverse. Use tables of the function and its inverse to show what you mean.

#16 When you look at the graph of a function and its inverse, you can see a symmetrical relationship between the two graphs demonstrated by a line of symmetry.

a. Use a colored pencil to draw the line of symmetry for each graph in problem 5-15.

b. What is the equation of the line of symmetry for each graph?

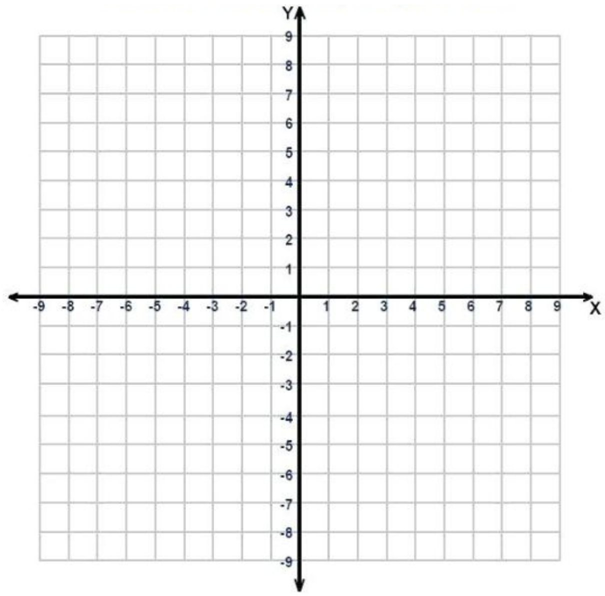
c. Why do you think this line makes sense as the line of symmetry between the graph of a function and its inverse?

#17

$$y = \left(\frac{x}{2}\right)^2$$

- ❏ Complete the table.
- ❏ Draw a complete graph.
- ❏ Trace the curve heavily with a crayon.
- ❏ Graph the line *y* = *x* & fold on that line.
- ❏ Rub the paper to create a "carbon copy" of the parabola.

x	y
-6	
-4	
-2	
0	
2	
4	
6	



#18 Now you will look at the relationship between the domain and range of a function and its inverse.

a. What are the domain and range of $y = (\frac{x}{2})^2$? What are the domain and range of its inverse?

Original:
Domain: Range:

Inverse:
Domain: Range:

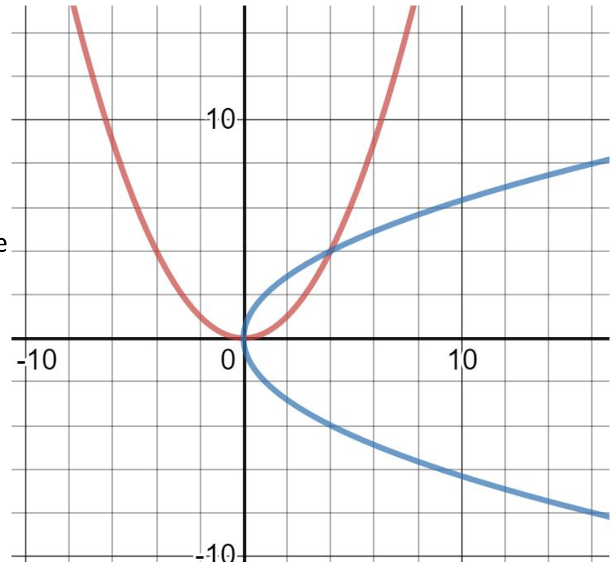
b. How are the domain and range of the original function related to the domain and range of the inverse?

#20 Write the equation of the inverse of $y = (\frac{x}{2})^2$.

Graph both equations on your graphing calculator to check that the graphs are symmetric. (Use zoom Zsquare to fix the proportions.) What do you notice?

#21 Consider your equation for the inverse of $y = (\frac{x}{2})^2$.

a. Is the inverse a function? How can you tell?



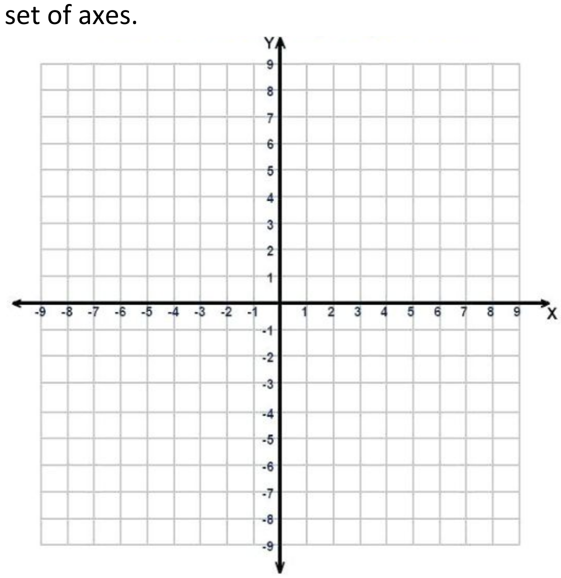
b. Use color to trace over the portion of your graph of $y = (\frac{x}{2})^2$ for which $x \geq 0$. Then use another color to trace the corresponding part of the inverse graph. Write an equation for the traced portion of the inverse graph.

c. In part (b) you **restricted the domain** of the original function so that the inverse was also a function. Is there a different way to restrict the domain so that the inverse is a function? What is the equation of this inverse function?

#22 Consider the function $g(x) = (x - 3)^2$.

a. How can you restrict the domain of $g(x)$ so that its inverse will be a function?

b. Graph $g(x)$ with its domain restricted, and then graph $g^{-1}(x)$ on the same set of axes.



c. What is the equation for $g^{-1}(x)$?

#23 How can you determine from a graph whether its inverse will be a function? Explain. What are some examples of other functions whose inverses are not functions?