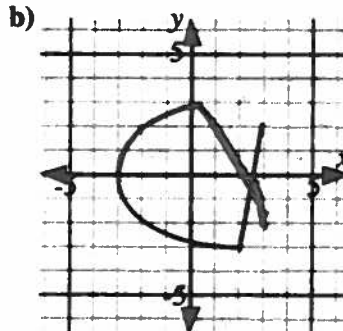
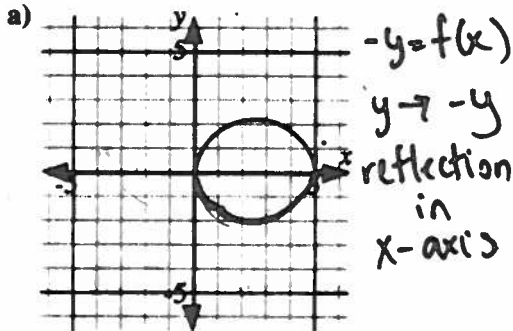
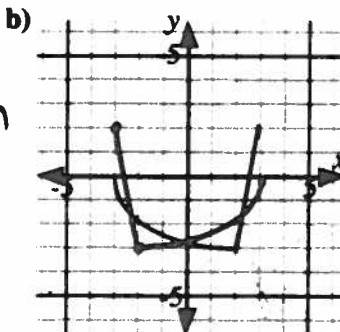
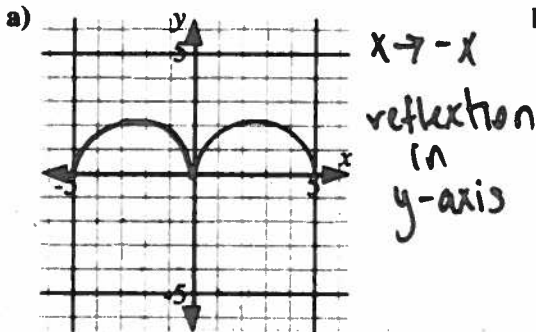


# Assignment

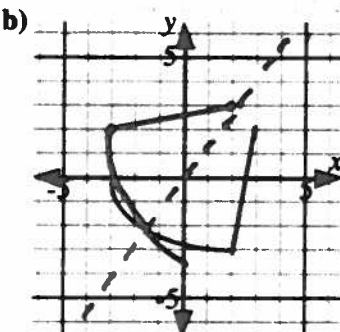
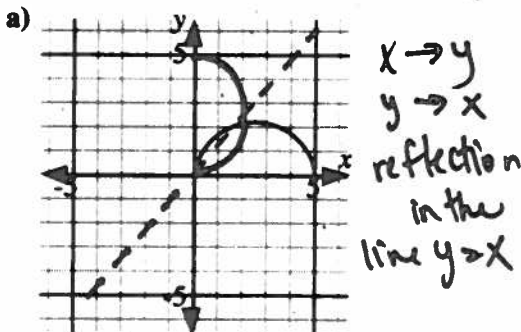
1. The graph of  $y = f(x)$  is shown. Sketch the graph of  $y = -f(x)$ .



2. The graph of  $y = f(x)$  is shown. Sketch the graph of  $y = f(-x)$ .



3. The graph of  $y = f(x)$  is shown. Sketch the graph of  $x = f(y)$ .



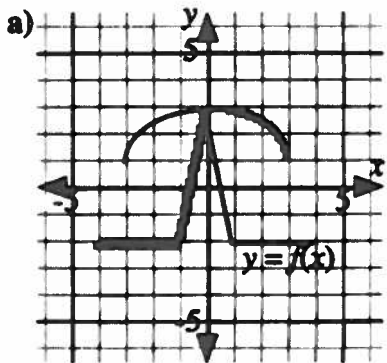
4. The function  $y = f(x)$  is transformed to the function below. Given that there are invariant points, describe the location of these points.

a)  $y = -f(x)$   
 $-y = f(x)$   $y \rightarrow -y$   
 reflection in x-axis

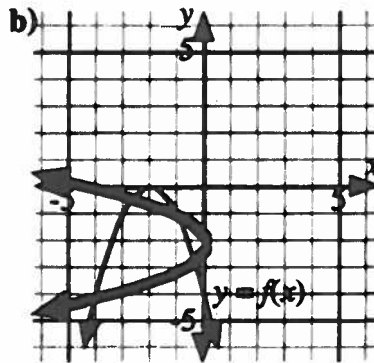
b)  $y = f(-x)$   
 $x \rightarrow -x$   
 reflection in  
 the y-axis

c)  $x = f(y)$   
 $x \rightarrow y, y \rightarrow x$   
 reflection in the line  
 $y = x$

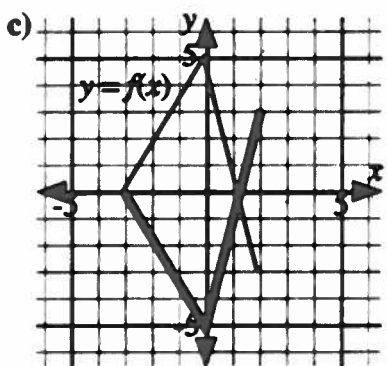
5. The graph drawn in the thick line is a transformation of the graph drawn in the thin line. Write an equation for each graph drawn in the thick line and state whether this graph represents a function.



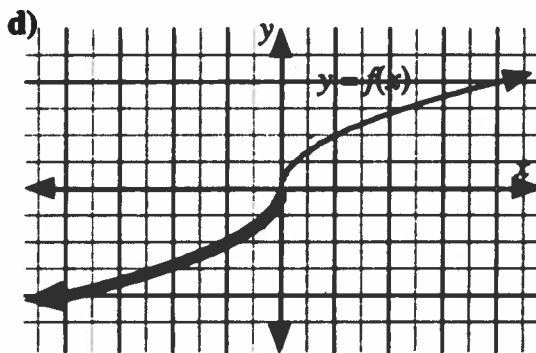
reflection in y-axis  
 $x \rightarrow -x$   
 $y = f(-x)$   
 is a function



reflection in line  $y = x$   
 $x = f(y)$   
 not a function.



reflection in x-axis  
 $y \rightarrow -y$   
 is a function



reflection in x-axis +  
 reflection in y-axis.  
 $x \rightarrow -x, y \rightarrow -y$   
 $-y = f(-x) \quad y = -f(-x)$   
 is a function.

6. The point  $(x, y)$  lies on the graph of the function  $y = f(x)$ . State the coordinates of the image of  $(x, y)$  under the following transformations:

a)  $y = -f(x)$

reflection in x-axis  
 $y \rightarrow -y$   
 $(x, -y)$

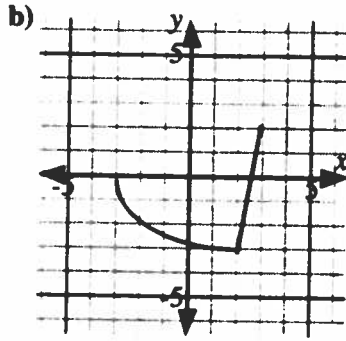
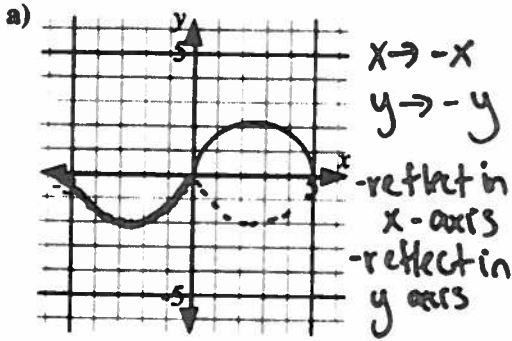
b)  $y = f(-x)$

reflection in  
 y-axis  
 $x \rightarrow -x$   
 $(-x, y)$

c)  $x = f(y)$

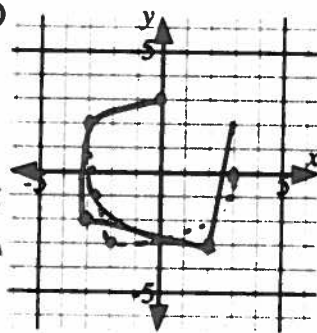
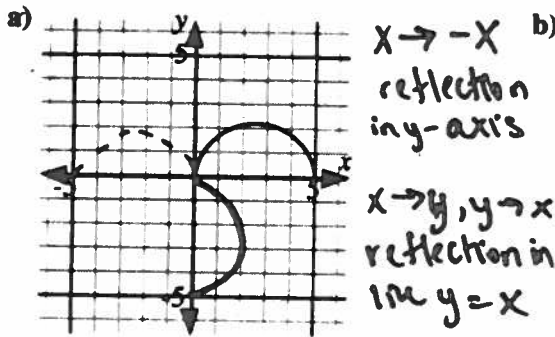
reflection in line  $y = x$   
 ~~$y = f(x)$~~   $x \rightarrow y$   
 $y \rightarrow x$   
 $(y, x)$

7. The graph of  $y = f(x)$  is shown. Sketch the graph of  $y = -f(-x)$ .



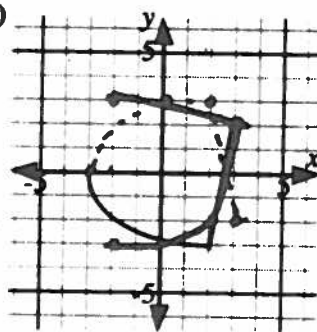
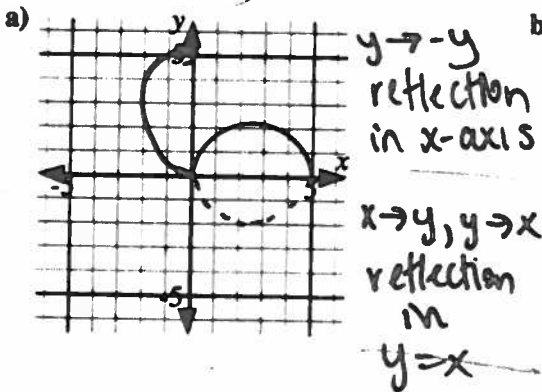
$y = f(x)$   
 $y = f(-x)$   
 $-y = f(-x)$   
 $y = -f(-x)$

8. The graph of  $y = f(x)$  is shown. Sketch the graph of  $x = f(-y)$ .



$y = f(x)$   
 ~~$x = f(y)$~~   $y = f(-x)$   
 ~~$x = f(-y)$~~   $x = f(-y)$

9. The graph of  $y = f(x)$  is shown. Sketch the graph of  $x = -f(y)$ .



$y = f(x)$   
 $-y = f(x)$   $y \rightarrow -y$   
 $y = -f(x)$   
 $x = -f(y)$

$x \rightarrow y$   
 $x \rightarrow -x$

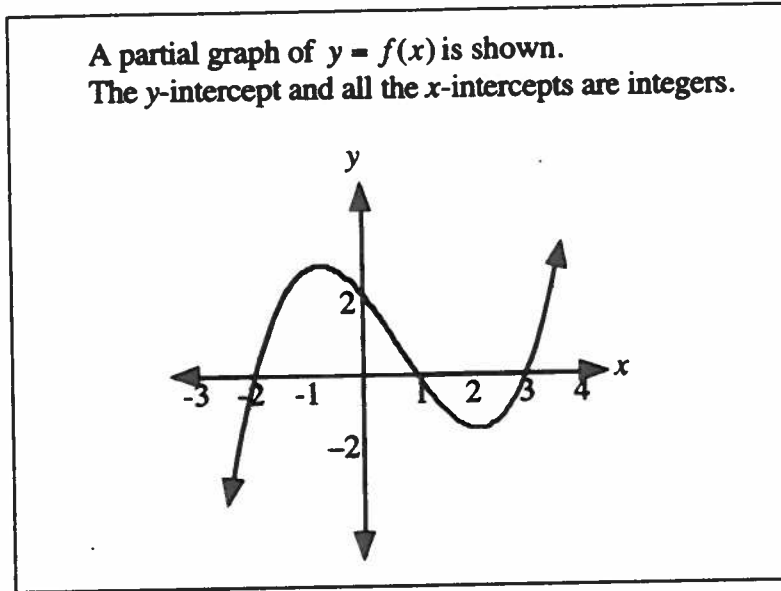
Multiple Choice

10. Consider the graph of a function of  $f$  and the graph of a function  $g$ , where  $g(x) = f(-x)$ . Any invariant points must lie on the

- A. x-axis
- B. y-axis
- C. line  $y = x$
- D. line  $y = -x$

$x \rightarrow -x$   
 reflection in y-axis

Use the following information to answer the next three questions.



11. If  $g(x) = -f(x)$ , the largest  $x$ -intercept of the graph of  $g$  is

- A. -2                      B. 1  
C. 2                      **D. 3**

$y = f(x)$   
 $y \rightarrow -y$      $-y = f(x)$      $y = -f(x)$   
reflection in  $x$ -axis     $3 \rightarrow 3$

12. If  $h(x) = f(-x)$ , the smallest  $x$ -intercept of the graph of  $h$  is

- A. -3**                      B. -2  
C. 2                      D. 3

$y = f(x)$   
 $y = f(-x)$      $x \rightarrow -x$   
reflection in  $y$ -axis     $3 \rightarrow -3$

13. On the graph of  $x = -f(y)$ , the  $y$ -intercept(s) is/are

- A. -2 only                      B. 2 only  
**C. -2, 1, and 3**                      D. -3, -1, and 2

$y = f(x)$   
①  $y \rightarrow y$      $-y = f(x)$      $y = -f(x)$   
② then  $x \rightarrow y$      $x = -f(y)$   
 $y \rightarrow x$   
reflection in  $x$ -axis then in line  $y = x$   
 $x$ -int -2, 1, 3  $\xrightarrow{x \text{-int}}$  -2, 1, 3  $\rightarrow$   $y$ -int -2, 1, 3

Numerical Response

14. If  $P(x) = -f(-x)$ , the largest  $x$ -intercept of the graph of  $P$  is \_\_\_\_\_.

(Record your answer in the numerical response box from left to right.)

2			
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reflection in  $x$ -axis     $x$ -int -2, 1, 3     $y \rightarrow -y$   
reflection in  $y$ -axis     $x$ -int 2, -1, -3  
 $x \rightarrow -x$