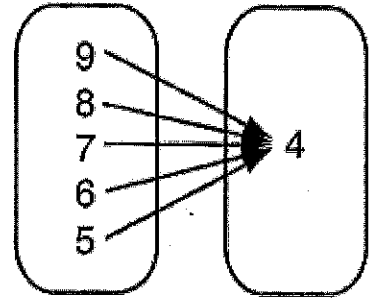
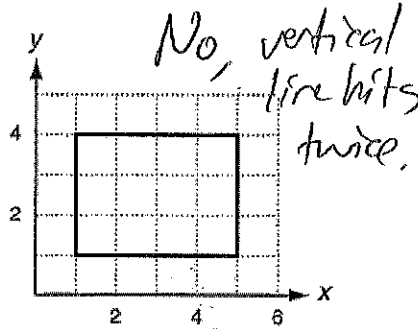


1. Tell whether the following are functions. Explain.

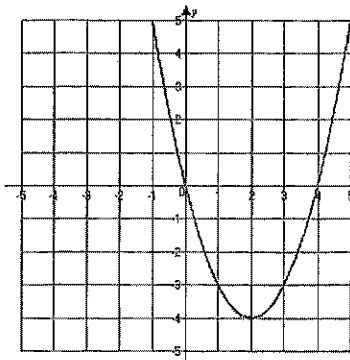
$\{(-2, 5), (-1, 1), (3, 1), (-1, -2)\}$

No,  $x = -1$  has  
 $y = 1$  &  $y = -2$

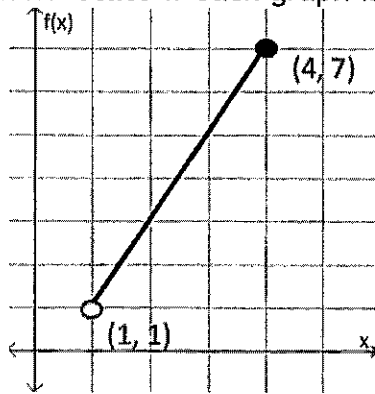


Yes, each  $x$   
has 1  $y$  ( $y=4$ ).

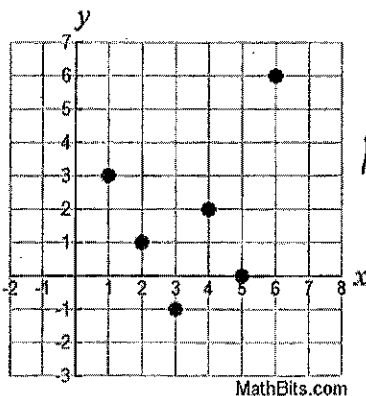
2. Find domain and range of the given graphs below. State if each graph is a function:



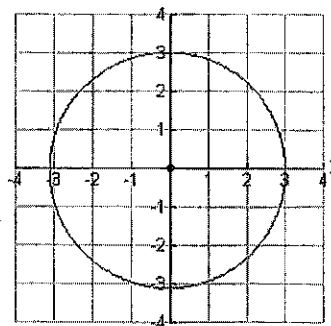
$D: (-\infty, \infty)$   
 $R: [-4, \infty)$   
Yes



$D: (1, 4]$   
 $R: (1, 7]$   
Yes



$D: 1, 2, 3, 4, 5, 6$   
 $R: -1, 0, 1, 2, 3, 6$   
Yes



$D: [-3, 3]$   
 $R: [-3, 3]$   
No

3. Use the functions  $f(x) = 2|x| - 5$ ,  $g(x) = x^2 - 3$ ,  $h(x) = 3x + 5$  to answer the questions below.

a. Evaluate  $f(-7)$

$$\begin{aligned} 2|-7| - 5 \\ 2 \cdot 7 - 5 \\ 14 - 5 \\ 9 \end{aligned}$$

b. Solve  $h(x) = -7$

$$\begin{aligned} 3x + 5 &= -7 \\ -5 &\quad -5 \\ 3x &= -12 \\ \frac{3x}{3} &= \frac{-12}{3} \\ x &= -4 \end{aligned}$$

c. Evaluate  $g(-4)$

$$\begin{aligned} (-4)^2 - 3 \\ 16 - 3 \\ 13 \end{aligned}$$

d. Solve  $g(x) = 1$

$$\begin{aligned} x^2 - 3 &= 1 \\ x^2 &= 4 \\ x &= 2 \text{ or } x = -2 \end{aligned}$$

e. Solve  $f(x) = -5$

$$\begin{aligned} 2|x| - 5 &= -5 \\ +5 &\quad +5 \\ 2|x| &= 0 \\ \frac{2|x|}{2} &= \frac{0}{2} \\ x &= 0 \end{aligned}$$

f. Evaluate  $h(-1)$

$$\begin{aligned} 3(-1) + 5 \\ -3 + 5 \\ 2 \end{aligned}$$

g. Find the domain of  $f(x)$ .

$$(-\infty, \infty)$$

h. Find the range of  $h(x)$

$$(-\infty, \infty)$$

i. Find the range of  $g(x)$

$$[-3, \infty)$$

4. The following graph completely defines  $f(x)$ .

a. Evaluate  $f(8)$

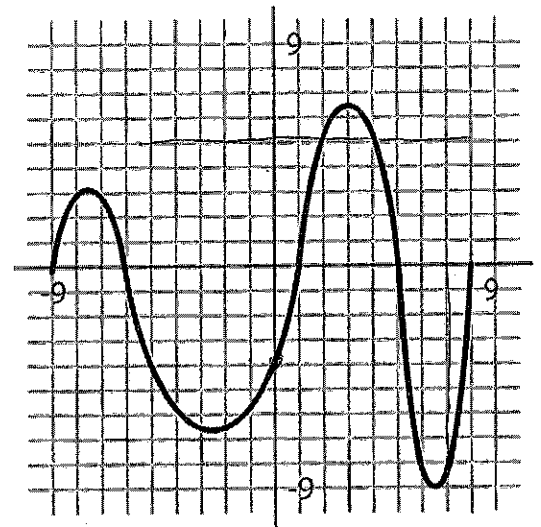
$$f(8) = -8$$

b. Evaluate  $f(0) - f(8)$

$$\begin{aligned} f(0) &= -4 \\ f(8) &= -8 \\ -4 - (-8) &= 4 \end{aligned}$$

c. Solve  $f(x) = 5$

$$f(x) = 5 \text{ if } x = 2 \text{ or } x = 4$$



5. Find the inverse of the following functions:

a.  $y = \frac{1}{2}x - 3$

$$y^{-1} = 2(x + 3)$$

c.  $h(x) = \frac{7x+18}{2}$

$$h^{-1}(x) = \frac{2x-18}{7}$$

b.  $g(x) = \sqrt[3]{x} + 3$

$$g^{-1}(x) = (x-3)^3$$

d.  $f(x) = 2x^4 + 5$

$$f^{-1}(x) = \sqrt[4]{\frac{x-5}{2}}$$

6. Given two function machines  $f(x) = x^2 - 1$  and  $g(x) = 3(x + 2)$ .

a. If the two machines are connected so that  $f(x)$  comes first, and 5 is dropped in, what comes out? (This is finding  $g(f(5))$ )

$$f(5) = 5^2 - 1 = 25 - 1 = 24$$

$$g(24) = 3(24 + 2) = 3(26) = 78$$

a. If the two machines are connected so that  $g(x)$  comes first, and 5 is dropped in, what comes out? (This is finding  $f(g(5))$ )

$$g(5) = 3(5 + 2) = 3 \cdot 7 = 21$$

$$f(21) = 21^2 - 1 =$$

7. Given two function machines  $f(x) = \frac{2}{x-7}$  and  $g(x) = 2x + 5$  calculate:

b.  $g(3) =$

d.  $f(g(2)) =$

c.  $f(10) =$

e.  $g(f(11)) =$

8. Find and verify the inverse of the following functions:

a.  $f(x) = 3(4x + 5) - 1$

b.  $g(x) = \frac{\sqrt[3]{x+4}}{2}$