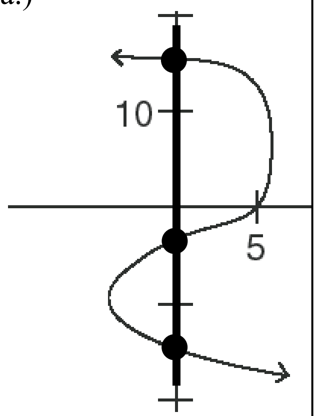
Investigating functions Solutions NAME:

This worksheet will help us practice the basic idea of a function and functional notation.

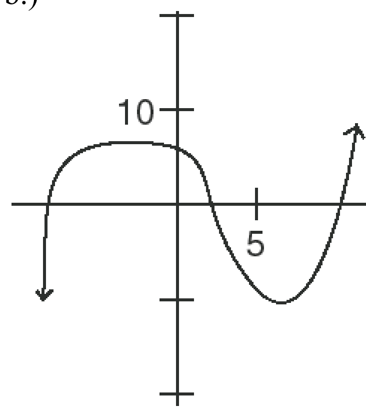
1. For each of the following graphs or equations, tell whether or not the relationship is a function. If it is **not** a function, give an *x* value that has more than one *y* value. Also, tell what those *y* values are (approximately, if need be) and show the points on the graph (if there is a graph).

a.)



This is not a function. For the x value of 0, y could be 15, -4, or -15. There is more than one y value for this x value. I am estimating the y values from the graph.

b.)



This is a function. It passes the vertical line test.

c.) $y + 7 = x^2 - 3$

$y = x^2 - 10$

This is a function. Imagine putting a value in for x. You will get only one y value out.

d.) $y^2 = x - 8$

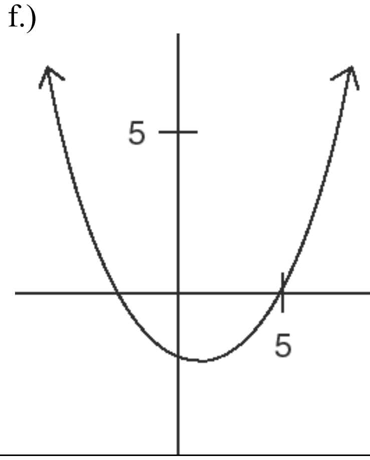
$y = \pm\sqrt{x-8}$

This is not a function. For the x value of 12, y could be -2 or 2.

e.) $y = 4x^2 - 3x + 7$

This is a function. Imagine putting a value in for x. You will get only one y value out.

f.)



This is a function. It passes the vertical line test.

2. For each of the following functions, use functional notation to find the desired values. Circle and label your final answers.

a.) $f(x)=\dfrac{x+3}{2}$; Find $f(-3)$, $f(5)$, and $f(10)$.

$$f(-3)=\frac{-3+3}{2}=\frac{0}{2}=0=f(-3)$$

$$f(5)=\frac{5+3}{2}=\frac{8}{2}=4=f(5)$$

$$f(10)=\frac{10+3}{2}=\frac{13}{2}=6.5=f(10)$$

b.) $g(x)=4x^3-3x^2+6x-4$; Find $g(-2)$, $g(0)$, and $g(1)$.

$$g(-2)=4(-2)^3-3(-2)^2+6(-2)-4=4(-8)-3(4)+-12-4=-32-12-12-4=-60=g(-2)$$

$$g(0)=4(0)^3-3(0)^2+6(0)-4=4(0)-3(0)+0-4=0-0+0-4=-4=g(0)$$

$$g(1)=4(1)^3-3(1)^2+6(1)-4=4(1)-3(1)+6-4=4-3+6-4=3=g(1)$$

c.) $h(t)=3t^2+2t-1$; Find $h(0)$, $h(-3)$, and $h(x+1)$.

$$h(0)=3(0)^2+2(0)-1=3(0)+0-1=0+0-1=-1=h(0)$$

$$h(-3)=3(-3)^2+2(-3)-1=3(9)+-6-1=27-6-1=20=h(-3)$$

$$\begin{aligned}h(x+1)=3(x+1)^2+2(x+1)-1&=3(x^2+2x+1)+2(x+1)-1\\&=3x^2+6x+3+2x+2-1\\&=3x^2+8x+4\\&=h(x+1)\end{aligned}$$