What is a Function?

Some Relations are called Functions.

Every x value is paired with one and only one y value.

For every input there is only one output

Other names for Domain and Range

Domain	Range
• x-coordinates • Input • Independent Variable	• y-coordinates • Output • Dependent Variable

Real-Life Functions and Non-Functions

You look up a word in the dictionary to get a definition:

Input (domain): A word
Output (range): Definition

Is a Dictionary a Function?

NO

a given word may have more than one meaning.

A policman looks up a license plate number to find who it is registered to:

Input (domain): License plate number
Output (range): Who the car is registered to

Does this relationship represent a Function?

Yes

The IRS looks up a Social Security Number to find out who the tax return if for:

Input (domain): Social Security Number
Output (range): Taxpayers Name

Does this relationship represent a Function?

Yes

You look up a friend's name in your address book to find a number you can call them at:

Input (domain): Friend's name
Output (range): Phone number

Does this relationship represent a Function?

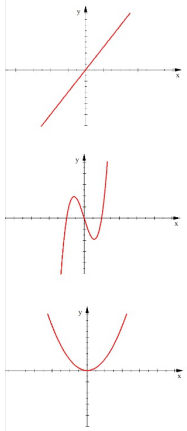
NO

Which of the following is correct?

1. Every Relation is a Function
   Every Rectangle is a Square
2. Every Function is a Relation ✓
   Every Square is a Rectangle

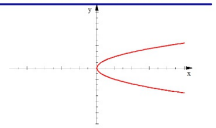
How can you tell if a graph represents a function?

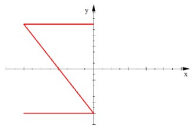
Is a Function



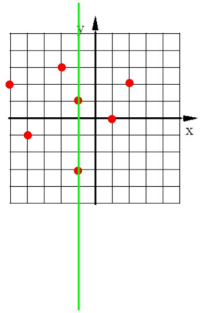
Examples of graphs that ARE and AREN'T Functions

Is NOT a Function





Vertical Line Test: If any vertical line can touch the graph more than once the relation is NOT a function.



Since the vertical line drawn intersects two points this graph is not a function.

(-1, 1)
(-1, -3)

These two points have the same x-coordinate but different y-coordinates which means for one input (x= -1) there is two outputs (y= 1 and y=3).

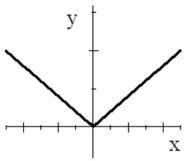
Is each of these relations a function?

a)

X	Y
-2	4
3	1
7	-6
4	1

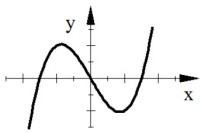
Yes

b)



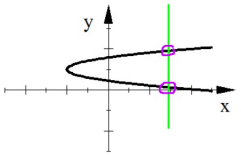
Yes

c)



Yes

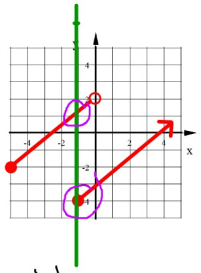
d)



NO

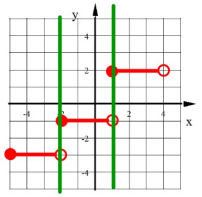
Is each of these relations a function?

e)



No

f)

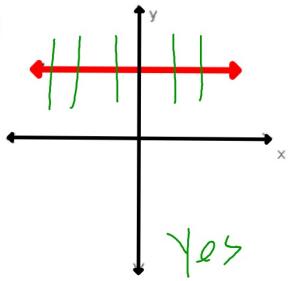


Yes

no vertical line will touch the graph more than once because of the open circles.

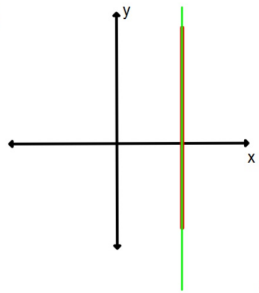
Is each of these relations a function?

g)



No vertical line touches the graph more than once.

h)

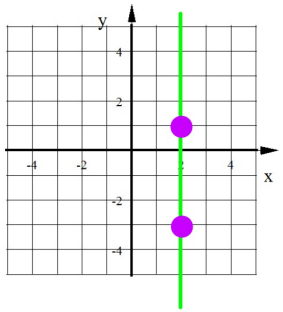


The green vertical line touches the graph (red vertical line) an infinite number of times

why isn't this relation a function?

(2, 1), (-3, 4), (5, -2), (2, -3)

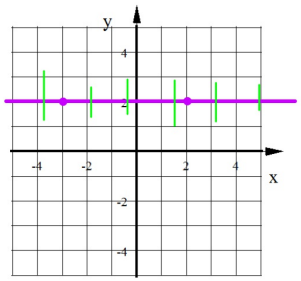
If two x-coordinates repeat the two points would line up vertically and the graph would FAIL the Vertical Line Test



If two y-coordinates repeat why IS the relation a function?

(-3, 2), (1, -4), (2, 2), (-5, 1)

Yes. It's okay if y-values repeat. These points create a Horizontal line and that is okay because no vertical line will touch a horizontal line more than once.



How do you say $f(x)$?

" f of x"

f is the function name

X is the Independent variable (the input)

f(x) does NOT mean f times x

What is another way to write $f(x) = 7x - 8$?

y = 7x - 8

f(x) = is just another way to write y =

If $f(x) = -2x + 3$ what does $f(5)$ mean?

evaluate the function f when x=5.

Find $f(5)$.

$= -2(5) + 3$

$= -10 + 3$

$f(5) = -7$

13. If $f(x) = x^2 + 3x$

find the range for this given domain: $Domain : \{-4, 0, 2\}$

Find each of the following:

f(-4) = $(-4)^2 + 3(-4) = 16 + -12 = 4$

f(0) = 0

f(2) = $2^2 + 3(2)$

$4 + 6$

$f(2) = 10$

Range: 0, 4, 10

Given the functions: $g(x) = -10x - 1$

and $k(r) = -2r^2 + 5$

1. Find g(5)

$g(5) = -10(5) - 1$

$= -51$

2. Find k(-3)

$K(-3) = -2(-3)^2 + 5$

$= -2(9) + 5$

$= -18 + 5$

$= -13$

3. Find x if g(x) = 29

$29 = -10x - 1$

$+1 \quad +1$

$\frac{30}{-10} = \frac{-10x}{-10}$

$x = -3$

Given the functions: $g(x) = -10x - 1$

and $k(r) = -2r^2 + 5$

4. Find k(5) - g(3)

$K(5) = -2(5)^2 + 5$

$= -45$

$g(3) = -10(3) - 1$

$= -31$

$-45 - -31$

$= -14$

5. Find 2g(1) + 3k(2)

$g(1) = -11$

$k(2) = -3$

$2(-11) + 3(-3)$

$-22 - 9$

-31

You can now finish Hwk #19
Sec 5-2
pages 244-245
problems 2, 4, 24, 28-30, 32, 38-41, 44