NAME: Core 4

Determining Functions Interactive Notes

VOCABULARY:

Relation: A **relation** is a set of ordered pairs.

Domain: The **domain** of the relation is the set of all first components of the ordered pairs. This is also called the **x value** or the **input**.

Range: The **range** of the relation is the set of all second components of the ordered pairs. This is also called the **y value** or the **output**.

Now we will consider a special kind of relation called a function.

Function: In order for a relation to be called a **function**, each x value must have exactly one y value. You cannot have two or more y values or no y values.

Vertical Line Test: This is a special test that can be used to determine if a graph is a function. If you can draw a vertical line so that it intersects a graph more than once, the graph is **NOT A FUNCTION**. If you cannot draw a vertical line that intersects a graph more than once, then the graph **IS A FUNCTION**.

Yes!

X	f(x)
4	5
-5	-2
8	5
0	1

Not!

x	f(x)
-2	4
-1	1
0	0
1	1
2	-4

range: { 5, 2, 1, 5 }

$f(x) = x^2 + 1$

1.) { (- 2, 5), (-1, 2), (0, 1), (2, 5) }

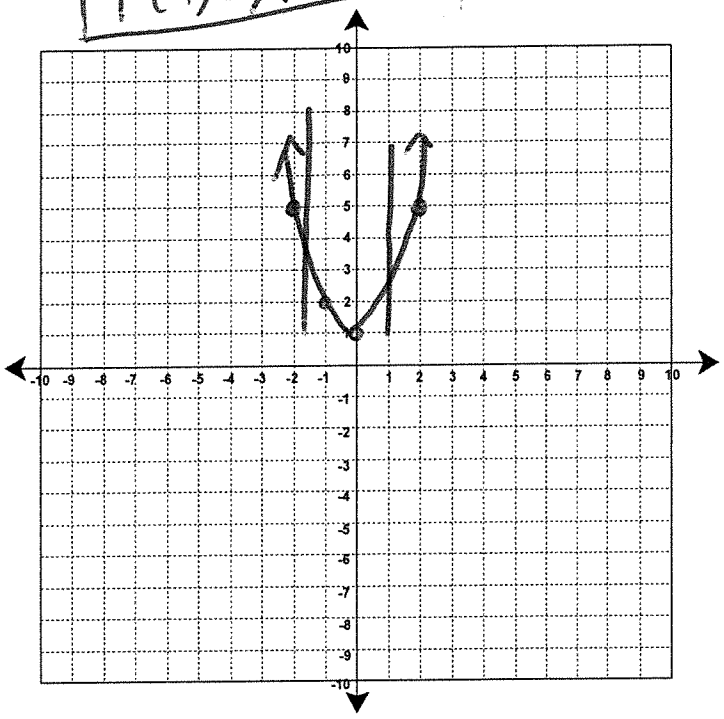
Does this relation represent a function?

Why or why not?

Yes, for every input there is exactly one output. (input)

list the domains of the relation...

{ -2, -1, 0, 2 }

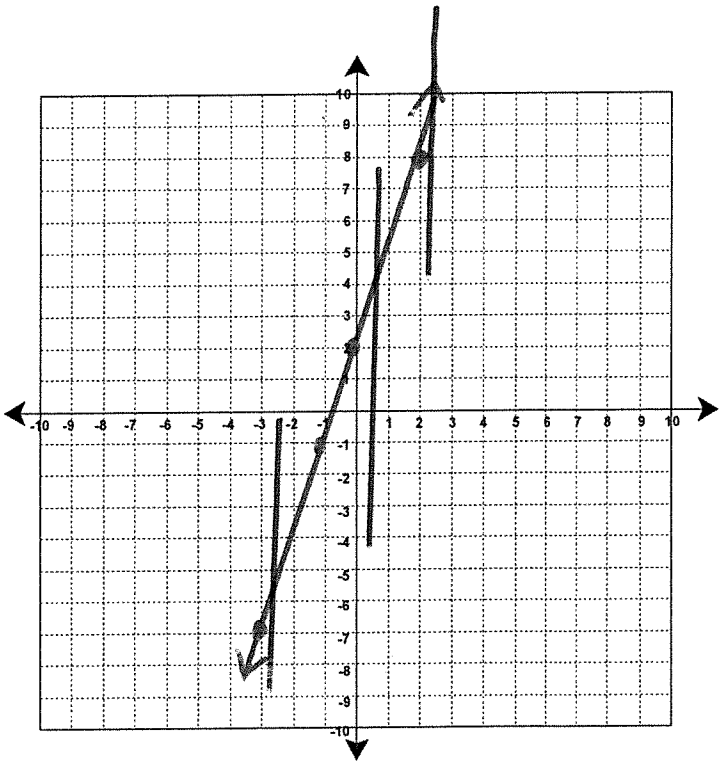


2.) { (2, 8), (- 3, -7), (0, 2), (-1, - 1) }

Does this relation represent a function?

Why or why not?

Yes, for every input there is exactly one output.



4 relations

3.) {(2, 0), (2, 4), (0, 2), (4, 2)}

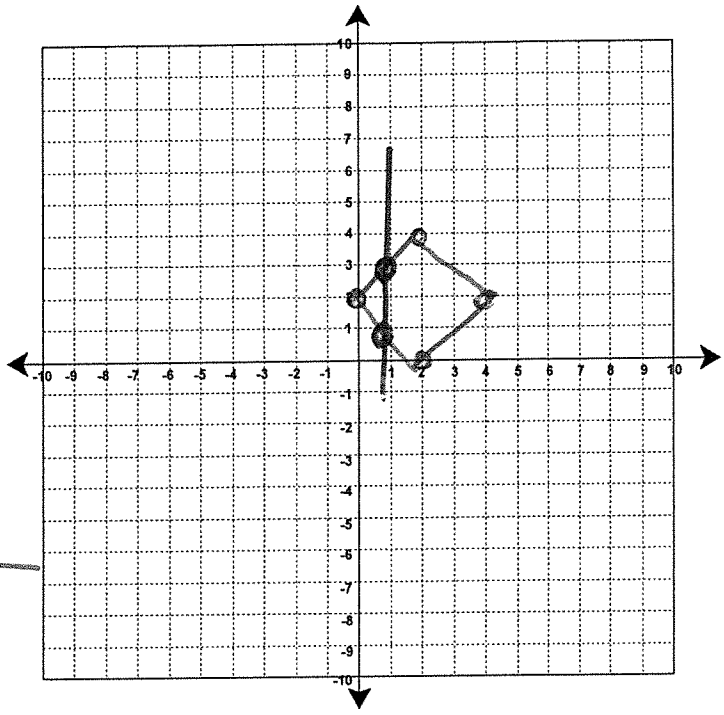
Does this relation represent a function?

Why or why not?

No, there are 2 outputs for 1 input.

domains: 2, 2, 0, 4

range: 0, 4, 2, 2

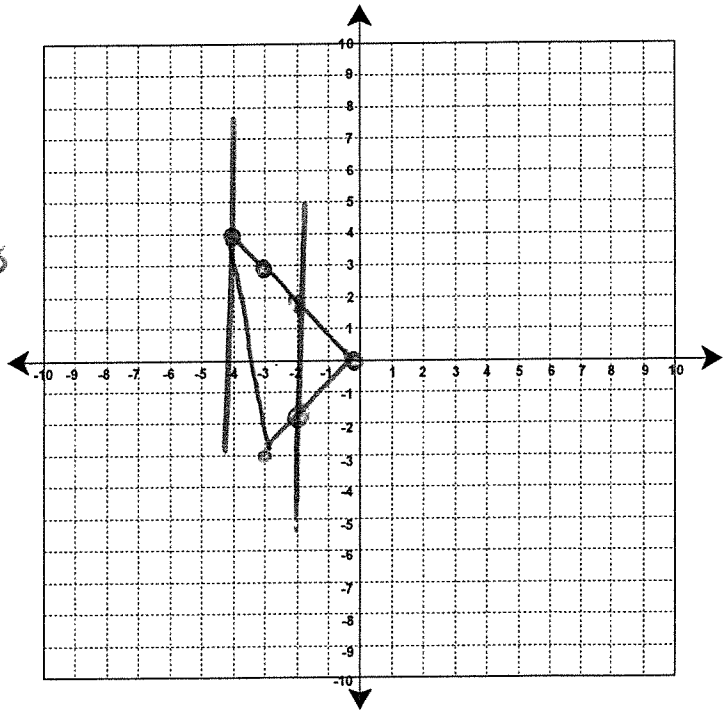


4.) {(-3, 3), (-4, 4), (-3, -3), (0, 0)}

Does this relation represent a function?

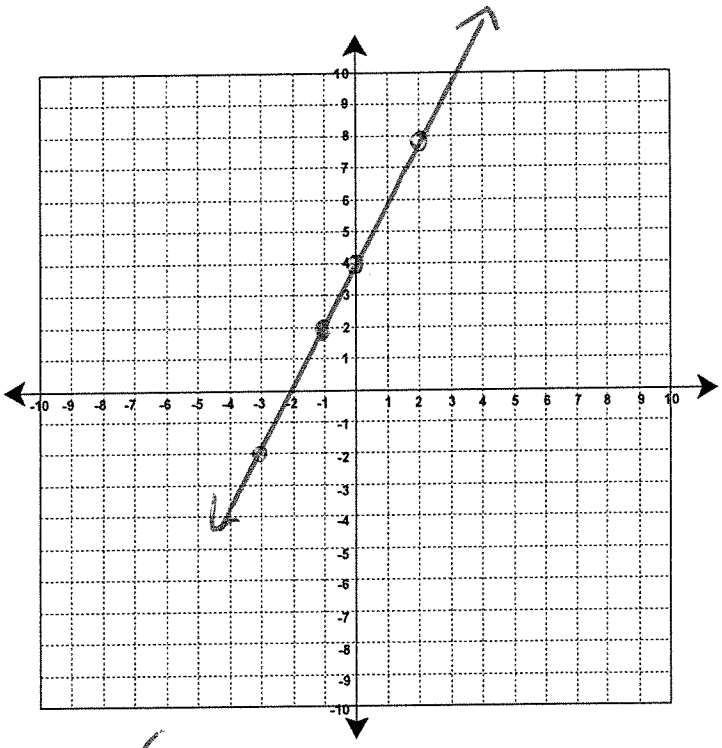
Why or why not?

No, there are 2 outputs for 1 input.



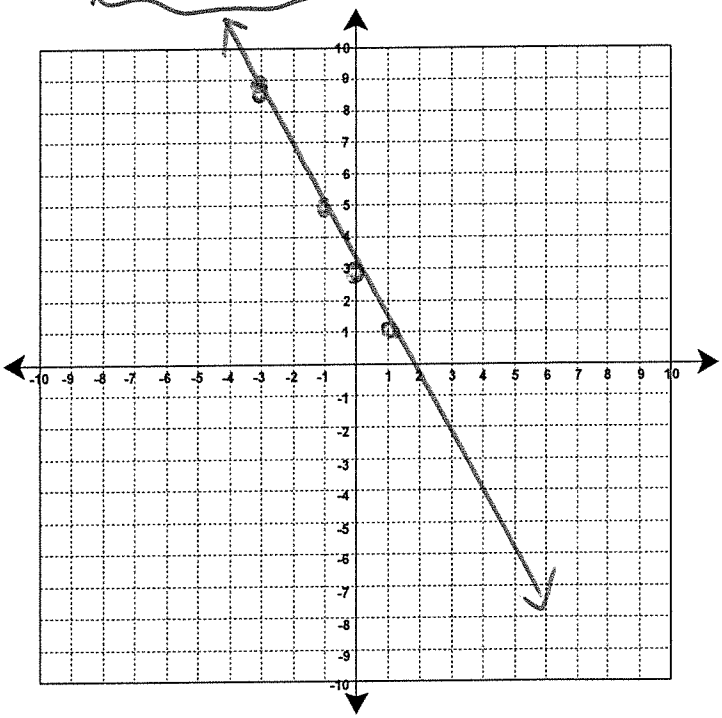
6.) Graph the function $y = 2x + 4$ (linear)

$(-3, -2)$ $(-1, 2)$ $(0, 4)$ $(2, 8)$



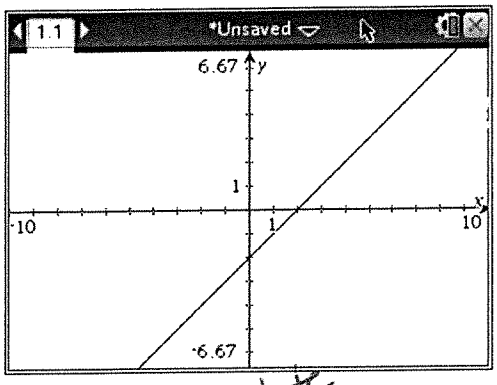
7.) Make a table of values and graph the function $y = -2x + 3$ $f(x) = -2x + 3$

x	y
-3	9
-1	5
0	3
1	1
4	-5



Let's practice looking at graphs and determining if the graph is a function.

8.)



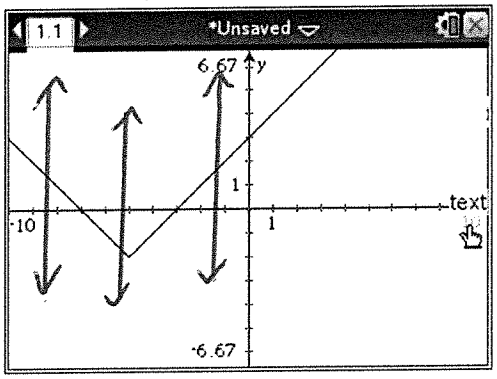
absolute value

Function or Not a Function

Why or Why Not?

linear function = straight line...

9.)

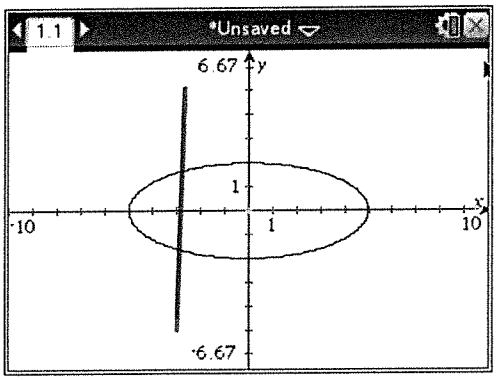


Function or Not a Function

Why or Why Not?

Yes, for every input there is exactly one output.

10.)

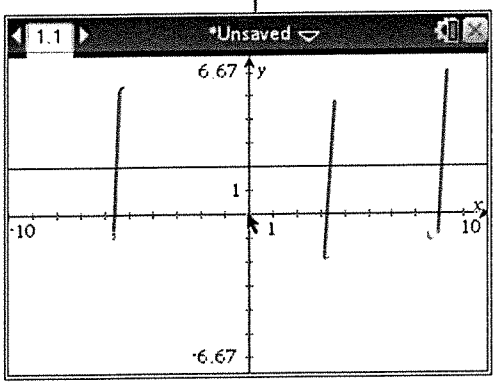


Function or Not a Function

Why or Why Not?

No, there are 2 outputs for 1 input.

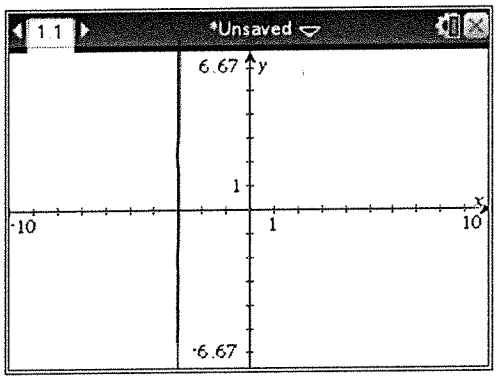
11.) $y = 2$



Function or Not a Function

Why or Why Not?

12.)



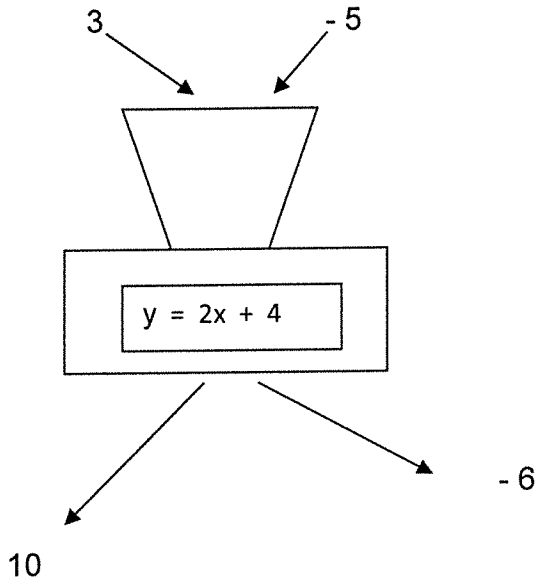
$X = -3$

Function or Not a Function

Why or Why Not?

If it helps, think of a function as a machine that has been programmed with a certain correspondence or rule. An input value is then fed into the machine, the machine does the correspondence or rule, and the result is the output.

Function Machine



5.) Make a table of more ordered pairs for this function.

Relationships

x Input Domain	Correspondence Rule	y Output Range
-3	y = 2x + 4	-2
-1	y = 2x + 4	2
0	y = 2x + 4	4
2	y = 2x + 4	8
	y = 2x + 4	
	y = 2x + 4	
	y = 2x + 4	

(Input, Output)

(-3, -2)

(-1, 2)

(0, 4)

(2, 8)

Name_____ Date_____ Hour_____

Evaluating Functions & Writing Domain/Range **Notes**

Example 1) Write the following function in function notation

$y = 2x - 4$ $f(x) = 2x - 4$

$f(n) = 2n - 4$ $f(\ell) = 2\ell - 4$

Your Turn 1) Write the following function in function notation

$y = -3x + 5$ $f(x) = -3x + 5$

Example 2) Evaluate the following function

If $f(x) = -2x + 5$, then find $f(4)$

input (domain)

$f(4) = -2(4) + 5$

$-8 + 5$ -3 $(4, -3)$

Your Turn 2) Evaluate the following function

If $f(x) = 4x - 1$, then find $f(-2)$

$f(-2) = 4(-2) - 1$

$-8 - 1$ -9 $(-2, -9)$

Example 3) Evaluate the following function

If $f(x) = x^3 + 5(x - 2)$, then find $f(-1)$

$f(-1) = (-1)^3 + 5(-1 - 2)$

$-1 \cdot -1 \cdot -1$ $5(-3)$

$-1 + -15$ -16 $(-1, -16)$

Your Turn 3) Evaluate the following function

If $f(x) = 3x^2 - 2(x + 4)$, then find $f(3)$

$3(3)^2 - 2(3 + 4)$

$3(9) - 2(7)$

$27 - 14$ 13 $(3, 13)$

Rules for writing the domain and range

1. The domain is the input (x) or first # listed in the
2. The range is the output (y) or second # in relation.

Example 4) State the domain and range of the following relation

$\{(4,0), (-2,4), (6,-1), (-4,0)\}$ (x, y)

domain: 4, -2, 6, -4

range: 0, 4, -1, 0

Your Turn 4) State the domain and range of the following relation

$\{(-2,-9), (3,2), (5,4), (8,-3), (3,5), (1,7)\}$

domain: -2, 3, 5, 8, 3, 1

ranges: -9, 2, 4, -3, 5, 7