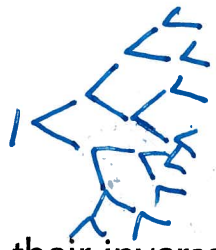
NOTES: FUNCTIONS INTRODUCTION



DAY 1 ✓

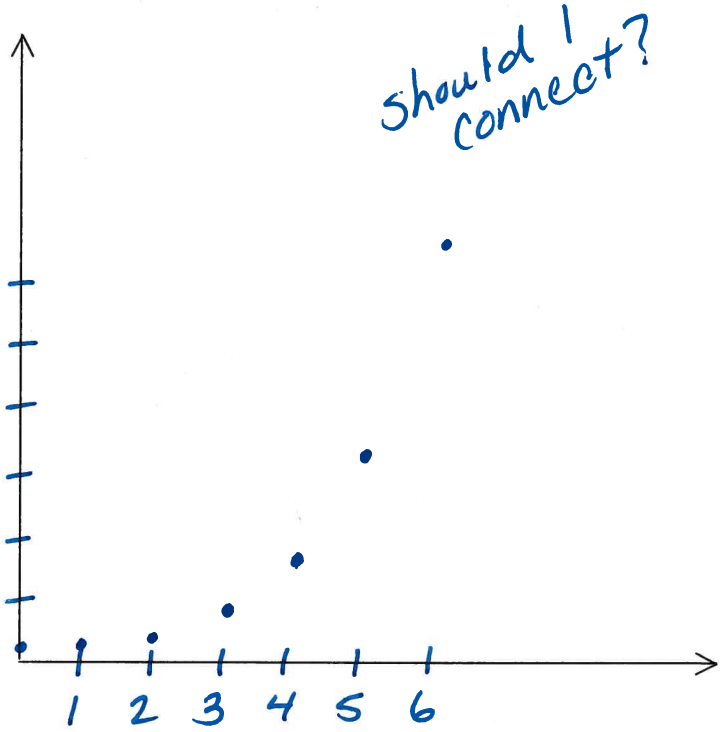
Textbook Chapter 2.1

OBJECTIVE: Today you will learn about functions and their inverses!

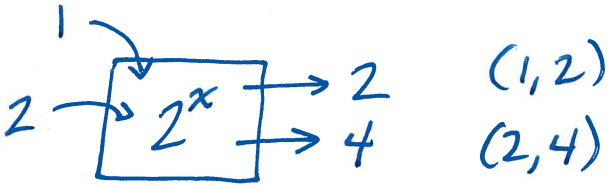
1. TABLE.

x	y	
0	1	2^0
1	2	2^1
2	4	2^2
3	8	2^3
4	16	2^4
5	32	2^5
6	64	2^6

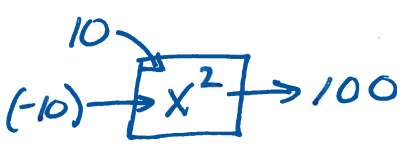
2. GRAPH

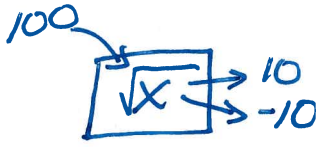


3. STORY: You are going to represent your function as a machine.



Functions are predictable!





4. EQUATION: Write this function in function notation: f(x) = output rule

Zombies(hours) = 2^h → the function evaluated at x.

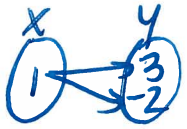
$Z(h) = 2^h$ or $f(x) = 2^x$

5. Does the graph represent a function? Why or why not?

Yes. It passes the vertical line test. If any vertical line can pass through the graph more than once, then the graph does not represent a function.

Function

Not a Function (1,3) and (1,-2)



PRACTICE: FUNCTION DEFINITION

Examples: Determine whether the relations shown are functions. Explain your answer. Identify the domain and range.

x	y
2	3
4	5
6	6
8	7

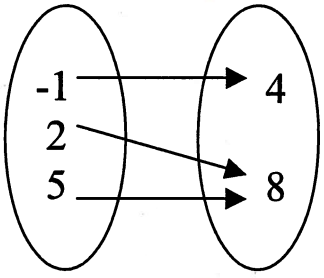
Domain {2, 4, 5, 6}
Range {3, 5, 6, 7}
Function? Yes
Each input has a unique output (x does not repeat)

x	y
1	5
2	5
3	10
4	10

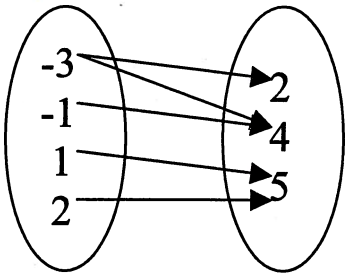
Domain {1, 2, 3, 4}
Range {5, 10}
Function? Yes

x	y
2	4
4	8
4	12
8	16

Domain {2, 4, 8}
Range {4, 8, 12, 16}
Function? No
4 has two outputs

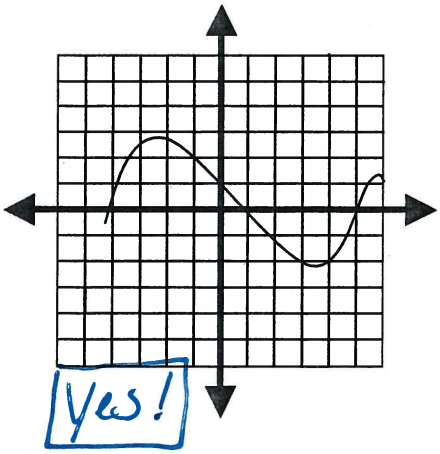


Domain {-1, 2, 5}
Range {4, 8}
Function? Yes



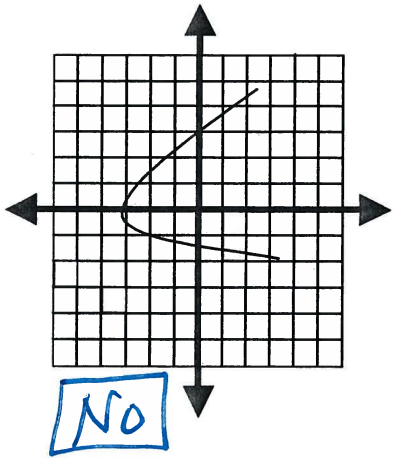
Domain {-3, -1, 1, 2}
Range {2, 4, 5}
Function? No
-3 has two outputs

Examples: Determine whether the relations shown are functions. Explain your answer.

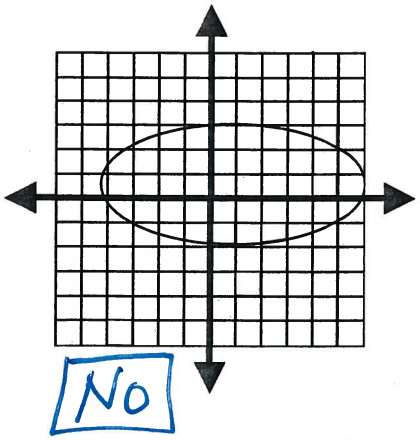


Yes!

Passes the vertical line test.



No



No

The second two functions do not pass the vertical line test, which means that there is more than one output for an input.

NOTES: INVERSE FUNCTIONS

DAY 1

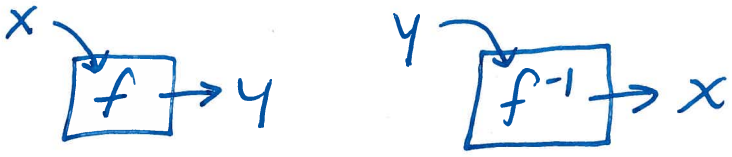
Textbook Chapter 6.4

INVERSE DEFINITION: An inverse function maps the output values back to their original input values.

* The domain and range are switched.

INVERSE FUNCTION REPRESENTATIONS:

1. Function Machine:



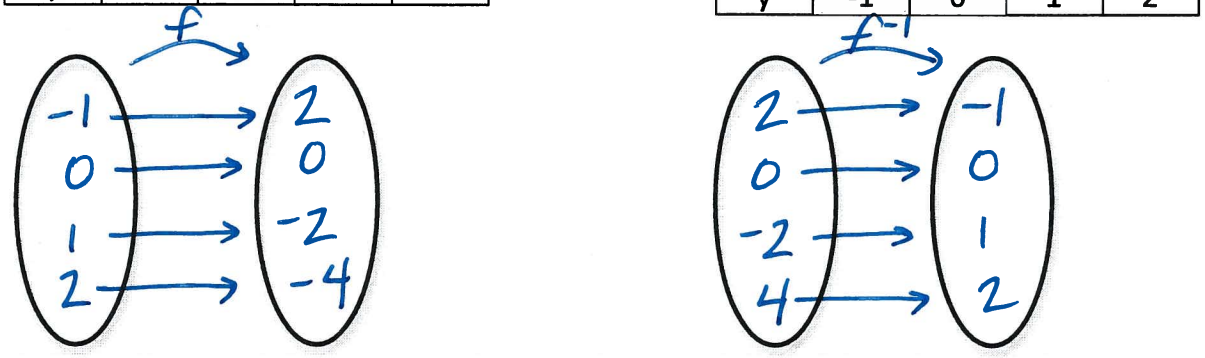
2. Table/Mapping Diagram

Original Relation

x	-1	0	1	2
y	2	0	-2	-4

Inverse Relation

x	2	0	-2	-4
y	-1	0	1	2

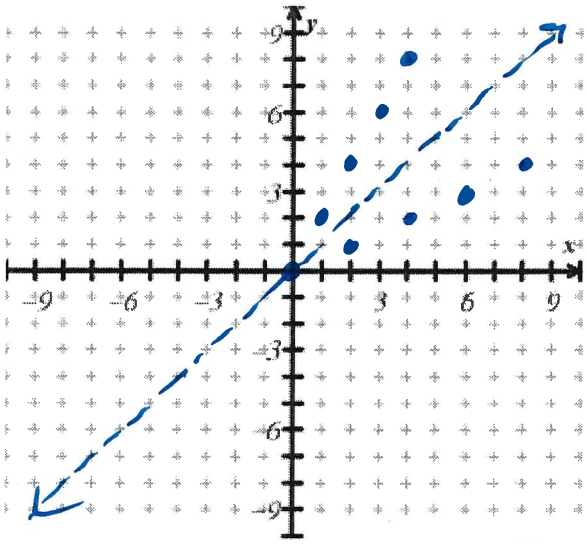


Inverses on a Graph

3. Plot the following points and their inverses.

(0, 0) (1, 2) (2, 4) (3, 6) (4, 8)

(0,0) (2,1) (4,2) (6,3) (8,4)



4. Then find the line of reflection.

y = x

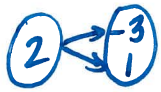
A graph and its inverse will always be reflected over the line y = x.

5. **IS THE INVERSE A FUNCTION?**

The inverse will be a function if the original function passes the: Horizontal Line Test

Inverse is not a function

f: function



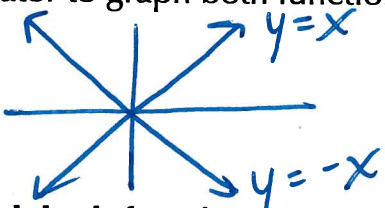
f^{-1}: Not a function

PRACTICE: INVERSE FUNCTIONS

EXAMPLE: Use the calculator to graph both functions. Then determine if they are inverses!

$f(x) = x$,

$g(x) = -x$

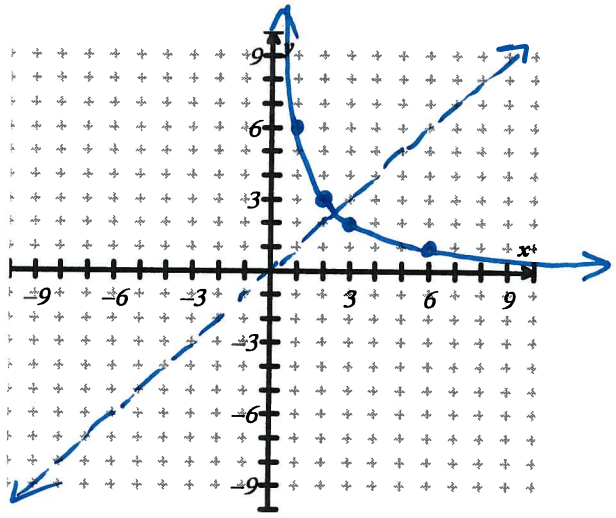


Not Inverses!

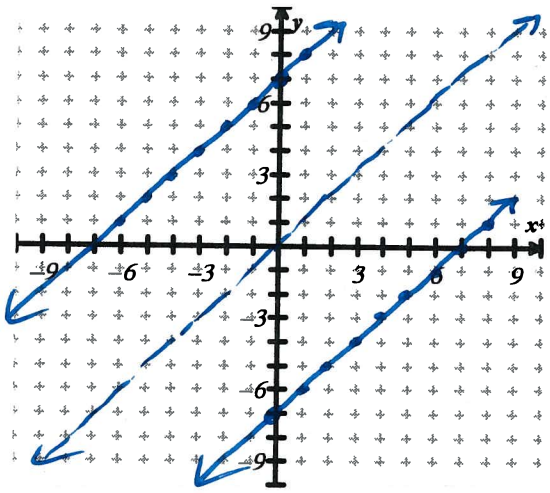
Use the calculator to graph both functions to determine if they are inverses.

1. $f(x) = -\sqrt{x-2}+3$ $\quad g(x) = \sqrt{-x-2}+3$

(2, 3)

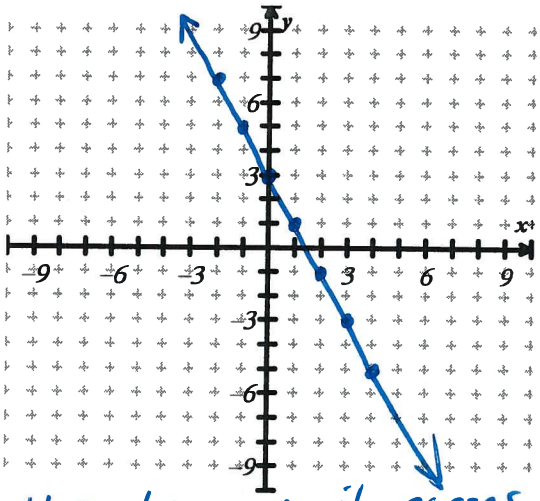


2. $f(x) = x + 7$, $\quad g(x) = x - 7$



3. Graph: $f(x) = -2x + 3$

Does the function have an inverse?

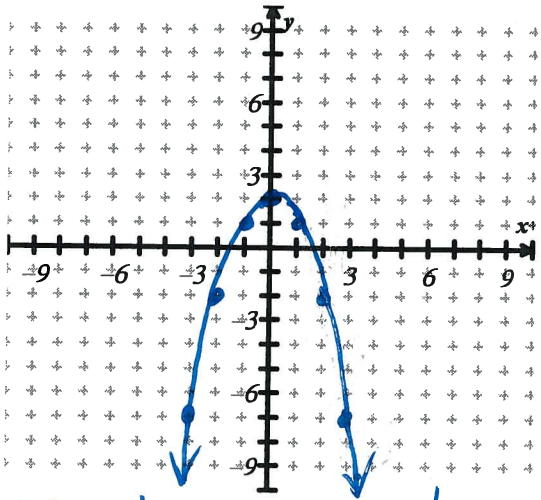


Yes, because it passes the horizontal line test.

4. Graph: $f(x) = -2x^2 + 2$

(0, 2)

Does the function have an inverse?



No, because it does not pass the horizontal line test.