4.1 Relations Vs. Functions

Warm up:

Make a table of values, then graph the relation
$y = 2x + 1$

X	Y
-2	
-1	
0	
1	
2	
3	
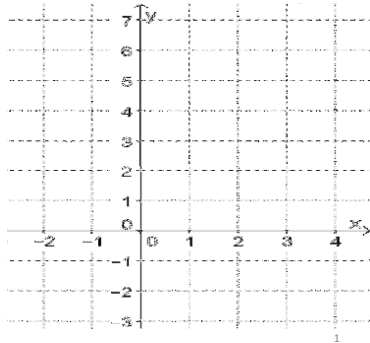
Function vs Relation

Definition:

A _relation_ is a rule which takes an input and <u>may/or may not</u> produce **multiple** outputs.

A _function_ is a special relation where every input has **at most** one output.

Notation:

Relation: $y = 2x + 1$

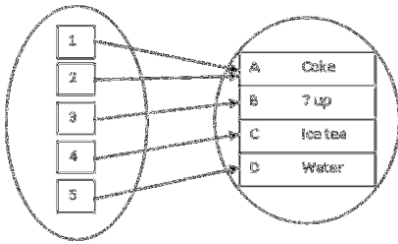Read it "f of x": the brackets here DO NOT MEAN MULTIPLY!!

Function: $f(x) = 2x + 1$

Ex 1: find $f(7) =$ 2(7) + 1
                    = 15

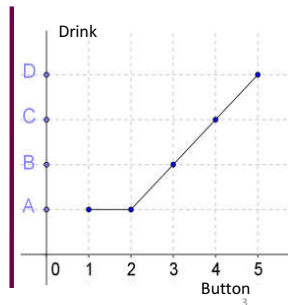   find $f(-5) =$ 2(-5) + 1
                      = -9

Consider 2 machines. **Machine A:**
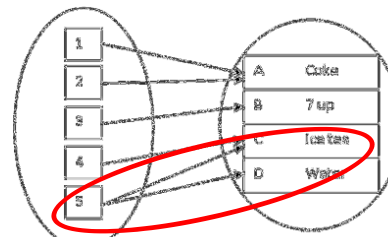
Buttons   Drink
Push **IN** to order   Comes **OUT**

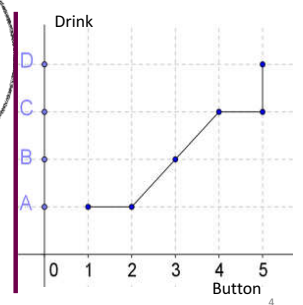**A FUNCTIONING MACHINE**

Vertical line test (VLT)

Machine B:

Buttons   Drink
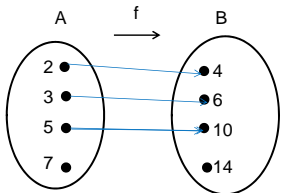Push **IN** to order   Comes **OUT**

A Not FUNCTIONING MACHINE
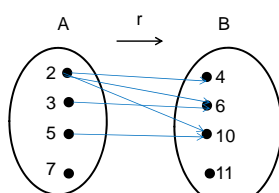
Vertical line test (VLT)

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(1) Mapping Diagram

Function **YES**   Function **NO**

Source   Target
Input   Output
Independent Dependent
X-values   Y-values
Antecedent Image
Domain   Range

Each source value has only ONE target value

A source value has MORE THAN ONE target value

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(2) Table of Values

Function **YES**

x	y
0	3
1	4
3	6
5	8

Function **NO**

x	y
1	0
2	1
4	3
4	5

Each x value has only ONE y value.
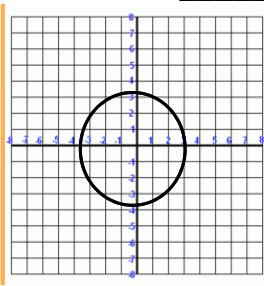
An x value has MORE THAN ONE y value

(3) Graph - Vertical Line Test (VLT)
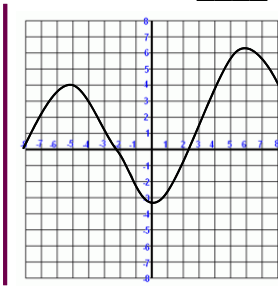
Function __YES__   Function __NO__

A vertical line touches the curve at ONLY 1 spot at a time

A vertical line touches MORE THAN 1 spot at a time.

Ex 2: Evaluate the following functions

a) $f(x) = 3x + 5$ find $f(3)$

b) $g(x) = x^2 + 1$ find $g(6)$

c) $h(x) = (x-2)(x-5)$ find $h(6)$

Practice:
Pages 94,95 # 2-6