

## Turn in Section 2 "Test Yourself"

### Section 3: Introduction to Functions

Section 3 – Topic 1 pg. 55  
Input and Output Values



Understand that a function is a relation in which for every input there is only one unique output

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## Relation vs Function

A **relation** is any set of ordered pairs.

A **function** is a relations where each  $x$  has at most 1  $y$ .

All functions are relations but not all relations are functions.

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What is your favorite number?

X (input)  
Y (output)

EA	MA	JH	AK	OP	SR	HT	NZ	SZ
1	13	6	3	5	28	3	2	7

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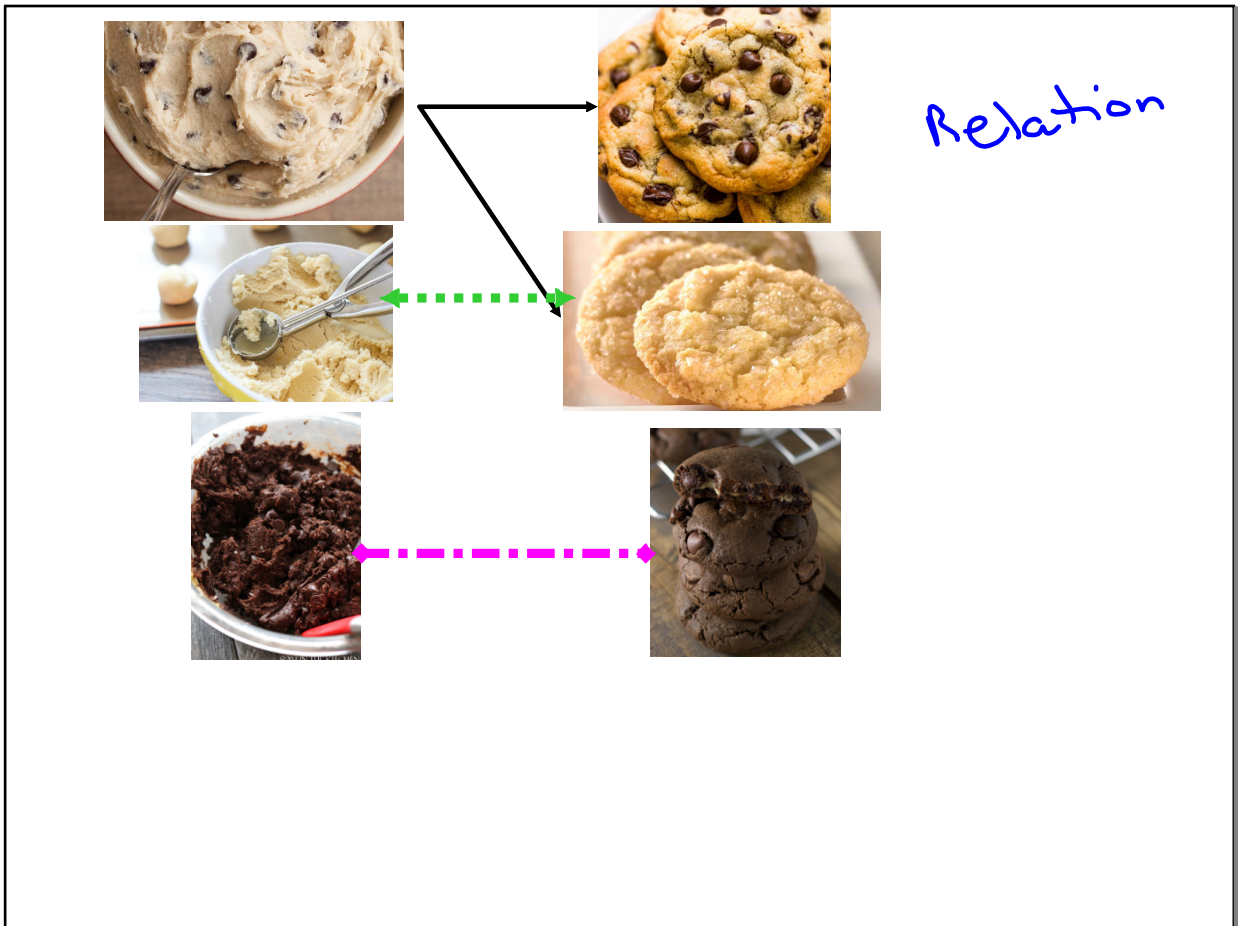
How many siblings do you have?

EA	MA	JH	AK	OP	SR	HT	NZ	SZ
2	4	1	1	1	2	2	2	1

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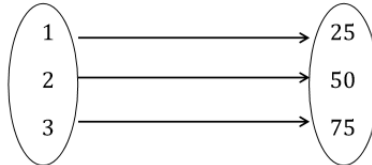
A function is a relationship between input and output.

- **Domain** is the set of values of  $x$  used for the input of the function.
- **Range** is the set of values of  $y$  calculated from the domain for the output of the function.

In a function, every  $x$  corresponds to only one  $y$ .

- $y$  can also be written as  $f(x)$ .

Consider the following function.



For every  $x$  there is a unique  $y$ .  
input domain                      output range

*Independent Variable*

*dependent variable*

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*input*

*output*

*Function*

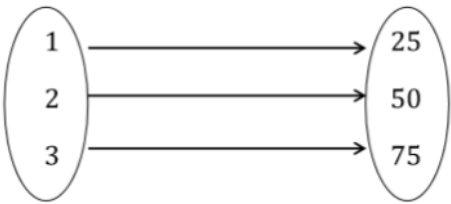
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We also refer to the variables as independent and dependent. The dependent variable depends on the independent variable.

Refer to the mapping diagram on the previous page.


Which variable is independent?  
X

Which variable is dependent?  
Y



For every  $x$  input domain there is a unique  $y$  output range

*Indep.* *Dep.*



*Indep* *Dep*

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Consider a square whose perimeter depends on the length of its sides.

What is the independent variable?  
+ the length of its sides  
x = length

What is the dependent variable?  
Perimeter  
y = Perimeter

How can you represent this situation using function notation?

$$P = 4s$$

$$y = 4x$$

$$f(x) = 4x$$

$$\underbrace{f(x)}_y$$

**STUDY TIP** We can choose any letter to represent a function, such as  $f(x)$  or  $g(x)$ , where  $x$  is the input value. By using different letters, we show that we are talking about different functions.

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1. You earn \$10.00 per hour babysitting. Your total earnings depend on the number of hours you spend babysitting.

- a. What is the independent variable?

# hrs spend babysitting

- b. What is the dependent variable?

Total earnings

- c. How would you represent this situation using function notation?

$h = \text{Total hours babysitting}$   
 $g(h) = 10h$   
 $y$

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2. The table below represents a relation.

$x$	$y$
-3	5
0	4
2	6
-3	8

- a. Is the relation also a function? Justify your answer.

No.  
-3 has 2 outputs

- b. If the relation is not a function, what number could be changed to make it a function?

Change one  $x = -3$   
to  $x = 3$

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3. Mrs. Krabappel is buying composition books for her classroom. Each composition book costs \$1.25.

a. What does her total cost depend upon?

The # of comp books  
She buys

b. What are the input and output?

$I = \#$  of comp. books bought  
 $O =$  Total cost

c. Write a function to describe the situation.

$b = \#$  of comp. books  
 $f(b) = 1.25b$

d. If Mrs. Krabappel buys 24 composition books, they will cost her \$30.00. Write this function using function notation.

$b = 24$   
 $f(b) = 1.25b$   
 $f(24) = 1.25(24)$   
 $\quad \quad \quad = 30$

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4. Consider the following incomplete mapping diagrams.

Diagram A

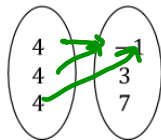


Diagram B

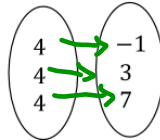
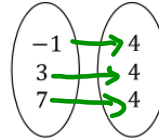


Diagram C



- Complete Diagram A so that it is a function.
- Complete Diagram B so that it is NOT a function.
- Is it possible to complete the mapping diagram for Diagram C so it represents a function? If so, complete the diagram to show a function. If not, justify your reasoning.

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**BEAT THE TEST!**

1. Isaac Messi is disorganized. To encourage Isaac to be more organized, his father promised to give him three dollars for every day that his room is clean and his schoolwork is organized.

Part A: Define the input and output for the given scenario.

Input: # of days he is organized

Output: # of dollars

Part B: Write a function to represent this situation.

$d = \# \text{ of days he is organized}$

$$f(d) = 3d$$

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2. The cost to manufacture  $x$  pairs of shoes can be represented by the function  $C(x) = 63x$ . Complete the statement about the function.

If  $C(6) = 378$ , then

0
6
63
378

pairs of shoes cost

\$6.
\$189.
\$378.
\$2,268.

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3. Which of the following relations is not a function?

- (A)  $\{(0, 5), (2, 3), (5, 8), (3, 8)\}$  Fun.  
(B)  $\{(4, 2), (-4, 5), (0, 0)\}$  Fun.  
(C)  $\{(6, 5), (4, 1), (-3, 2), (4, 2)\}$  Rel.  
(D)  $\{(-3, -3), (2, 1), (5, -2)\}$  Fun.

look @  
the x values.  
If all are  
diff it is  
most likely  
a function

## Relation vs Function

A **relation** is any set of ordered pairs.

A **function** is a relations where each x has at most 1 y.

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## HW - Worksheet

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