

## Bellwork: Algebra 1

1. Write down your homework for the night in your planner.
2. Make sure you have a calculator, your composition book, and Algebra Nation book.
3. Turn in your assignment from Friday if you have not done so already.
4. Glue in this new divider. Go back to the blue divider and fill in updated score.
5. Answer the following on your WEDNESDAY bellwork sheet:

Define these words (in the mathematical sense):

input, output, independent variable, dependent variable

output = dependent variable

input = independent variable



A function is a relationship between input and output.

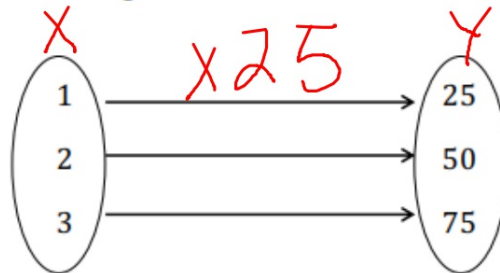
- **Domain** is the set of values of  $x$  used for the input of the function.
- **Range** is the set of values of  $y$  calculated from the domain for the output of the function.

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

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

$f$  of  $x$

Consider the following function.



For every  $x$  there is a unique  $y$ .

input domain                      output range

$(x, y)$

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-value, input, domain

Which variable is dependent?

y-value, output, range

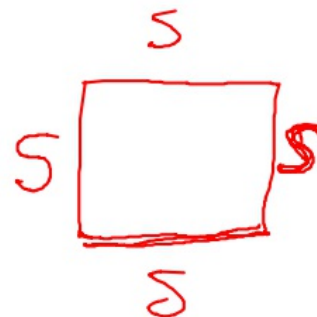
Consider a square whose perimeter depends on the length of its sides.

What is the independent variable?

side length

What is the dependent variable?

Perimeter



How can you represent this situation using function notation?

$$f(s) = s + s + s + s$$

$$f(s) = 4s \quad L$$

$$f(13) = 4(13) = 52$$

**Let's Practice!**

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?

hours

b. What is the dependent variable?

\$

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

$$f(h) = 10h$$

$$10(24)$$
$$f(24) = 240$$

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 goes to 5

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

$$f(30) = 300$$
$$5 \frac{1}{3} 8$$

**Try It!**

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

a. What does her total cost depend upon?

# of books

b. What are the input and output?

input = # of books  
output = \$

c. Write a function to describe the situation.

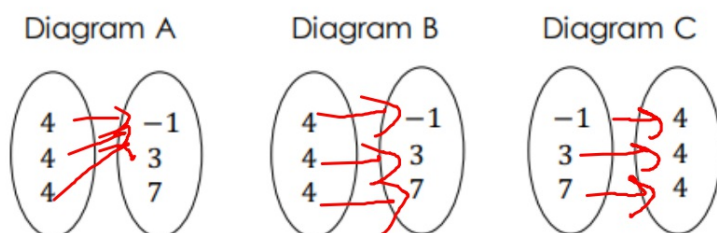
$$f(b) = 1.25b$$

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

$$f(24) = 30$$

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4. Consider the following incomplete mapping diagrams.



- a. Complete Diagram A so that it is a function.
- b. Complete Diagram B so that it is NOT a function.
- c. 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.

### **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

Output:

\$

Part B: Write a function to represent this situation.

$$f(d) = 3d$$
$$f(9) = 27$$



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.

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

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

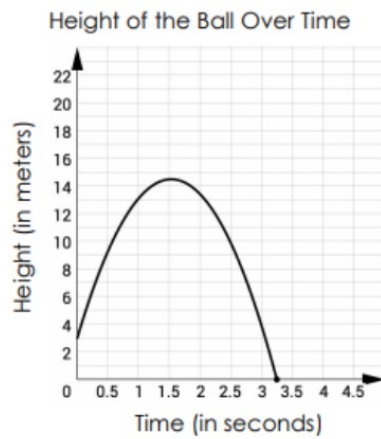
$(x, y)$

A ball is thrown into the air with an initial velocity of 15 meters per second. The quadratic function  $h(t) = -4.9t^2 + 15t + 3$  represents the height of the ball above the ground, in meters, with respect to time  $t$ , in seconds.

Determine  $h(2)$  and explain what it represents.

Is  $-3$  a reasonable input for the function?

The graph below represents the height of the ball with respect to time.



What is a reasonable domain for the function?

What is a reasonable range for the function?

**Let's Practice!**

1. On the moon, the time, in seconds, it takes for an object to fall a distance,  $d$ , in feet, is given by the function  $f(d) = 1.11\sqrt{d}$ .
  - a. Determine  $f(5)$  and explain what it represents.
  - b. The South Pole-Aitken basin on the moon is 42,768 feet deep. Determine a reasonable domain for a rock dropped from the rim of the basin.
2. Floyd drinks two Mountain Dew sodas in the morning. The function that represents the amount of caffeine, in milligrams, remaining in his body after drinking the sodas is given by  $f(t) = 110(0.8855)^t$  where  $t$  is time in hours. Floyd says that in two days the caffeine is completely out of his system. Do you agree? Justify your answer.

**Try It!**

3. Medical professionals say that  $98.6^\circ\text{F}$  is the normal body temperature of an average person. Healthy individuals' temperatures should not vary more than  $0.5^\circ\text{F}$  from that temperature.
  - a. Write an absolute value function  $f(t)$  to describe an individual's variance from normal body temperature, where  $t$  is the individual's current temperature.
  
  
  
  
  - b. Determine  $f(101.5)$  and describe what that tells you about the individual.
  
  
  
  
  - c. What is a reasonable domain for a healthy individual?

**BEAT THE TEST!**

1. The length of a shipping box is two inches longer than the width and four times the height.

*Part A:* Write a function  $V(w)$  that models the volume of the box, where  $w$  is the width, in inches.

*Part B:* Evaluate  $V(10)$ . Describe what this tells you about the box.