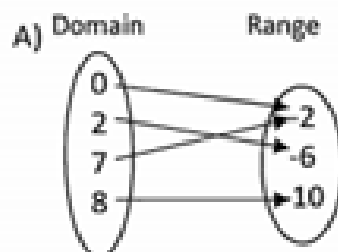


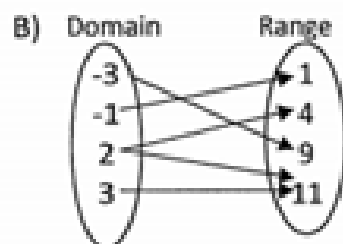
Get your homework and have it ready to check your answers. We will have a Quiz on Tuesday!

Classwork- Linear Functions

1) Determine if the if the following relations in the diagrams are functions.



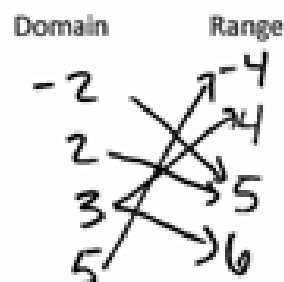
Function? Yes or No



Function? Yes or No

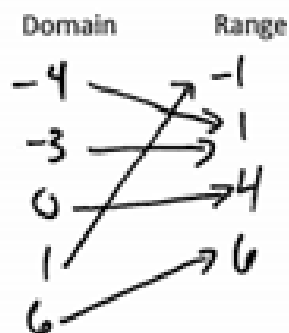
2) Determine if the following relations are functions. Draw a diagram with arrows.

A) $\{(-2, 5), (2, 5), (3, 4), (5, -4), (3, 6)\}$



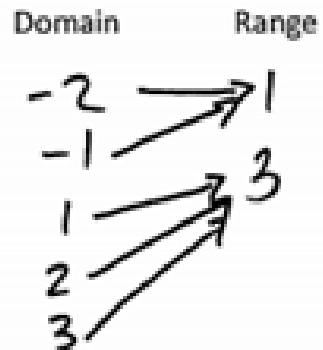
Function? Yes or No

B) $\{(-4, 1), (-3, 1), (0, 4), (1, -1), (6, 6)\}$



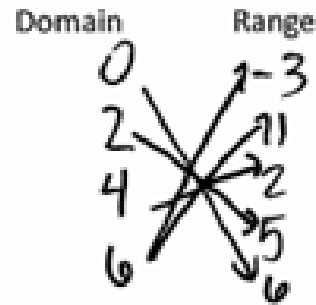
Function? Yes or No

C) $\{(-2,1), (-1, 1), (1, 3), (2, 3), (3, 3)\}$



Function? Yes or No

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



Function? Yes or No

3) Determine if the following tables are functions.

A)

x	-7	-3	0	0	5
y	9	-5	4	2	0

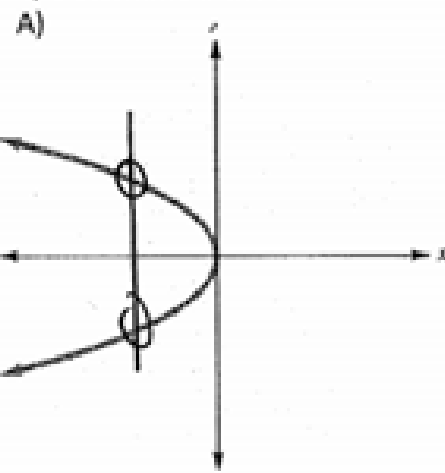
Function? Yes or No

B)

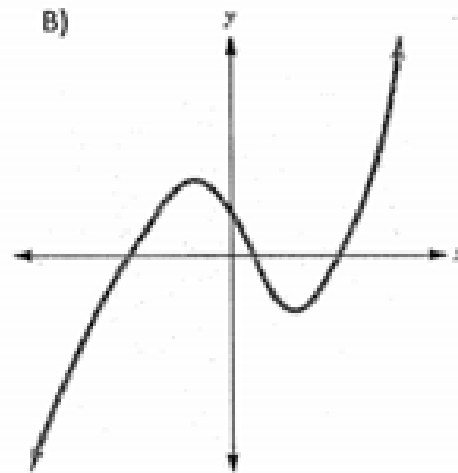
x	0	2	5	9	15
y	-5	3	-8	3	3

Function? Yes or No

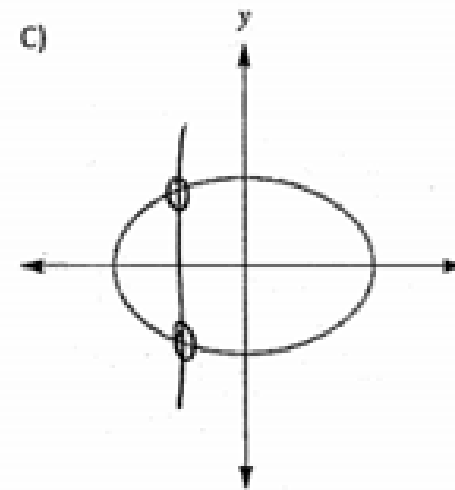
4) Determine if the if the following relations are functions.



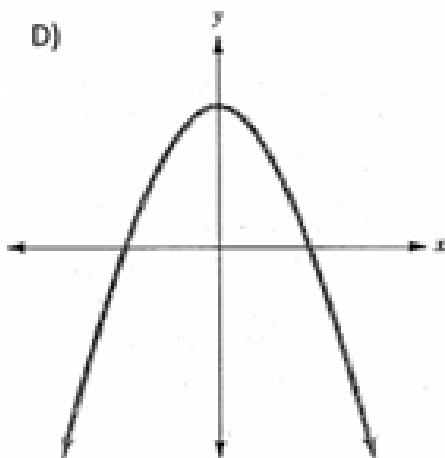
Function? Yes or **No**



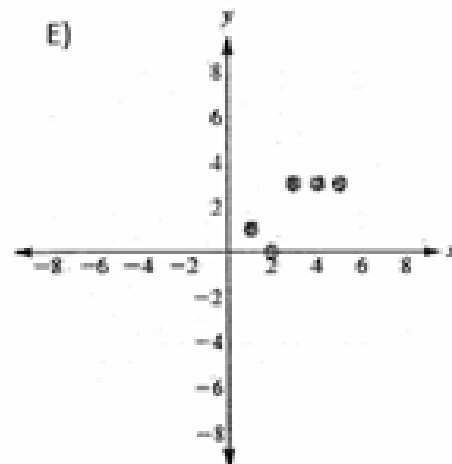
Function? **Yes** or No



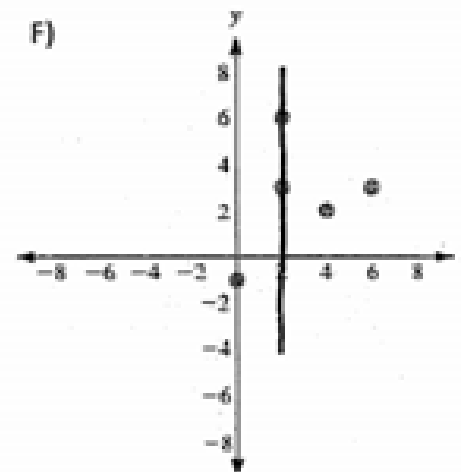
Function? Yes or **No**



Function? **Yes** or No



Function? **Yes** or No



Function? Yes or **No**



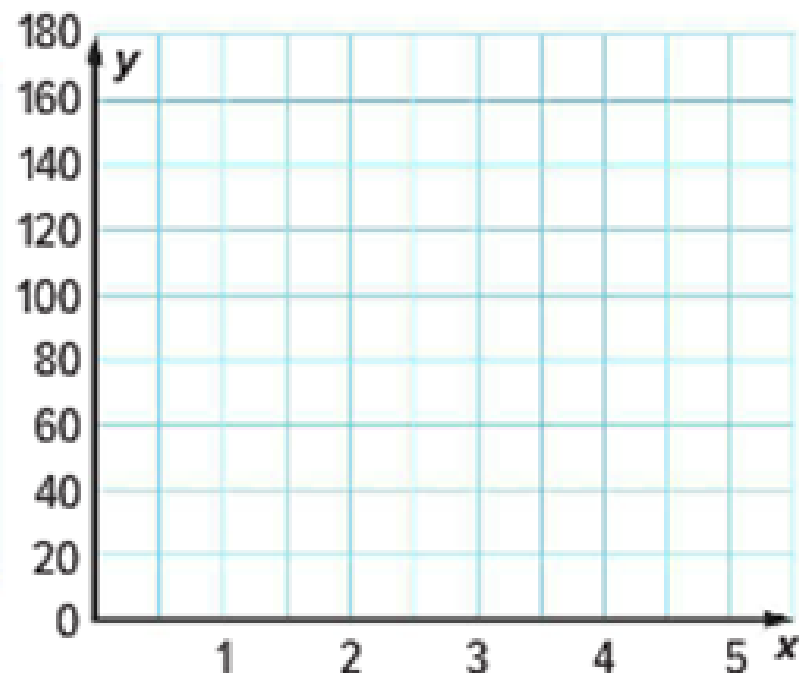
Real-World Link

Up, Up, and Away The Lockheed SR-71 Blackbird has a top speed of 36.6 miles per minute. If x represents the minutes traveled at this speed, the function rule for the distance traveled is $y = 36.6x$.

1. Complete the function table.

Input	x	1	2	3	4
Rule	$36.6x$	$36.6(1)$	$36.6(2)$		
Output	y	36.6			
(Input, Output)	(x, y)	$(1, 36.6)$			

2. Graph the ordered pairs (x, y) on the coordinate plane provided. What do you notice about the graph?



Graph a Function

Sometimes functions are written using two variables. One variable, usually x , represents the domain and the other, usually y , represents the range. When a function is written in this form it is an equation.

Like equations, functions can be represented in words, in a table, with a graph, and as ordered pairs. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.



Example



1. The school store sells book covers for \$2 each and notebooks for \$1. Toni has \$5 to spend. The function $y = 5 - 2x$ represents the number of book covers x and notebooks y she can buy. Graph the function. Interpret the points graphed.

Step 1

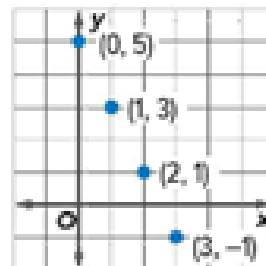
Choose values for x and substitute them in the function to find y .

x	$5 - 2x$	y
0	$5 - 2(0)$	5
1	$5 - 2(1)$	3
2	$5 - 2(2)$	1
3	$5 - 2(3)$	-1

Step 2

Graph the ordered pairs (x, y) .

She cannot buy negative amounts. So she can buy 0 covers and 5 notebooks, 1 cover and 3 notebooks, or 2 covers and 1 notebook.



$$\begin{array}{r} 2x + y = 5 \\ -2x \qquad -2x \\ \hline y = 5 - 2x \end{array}$$

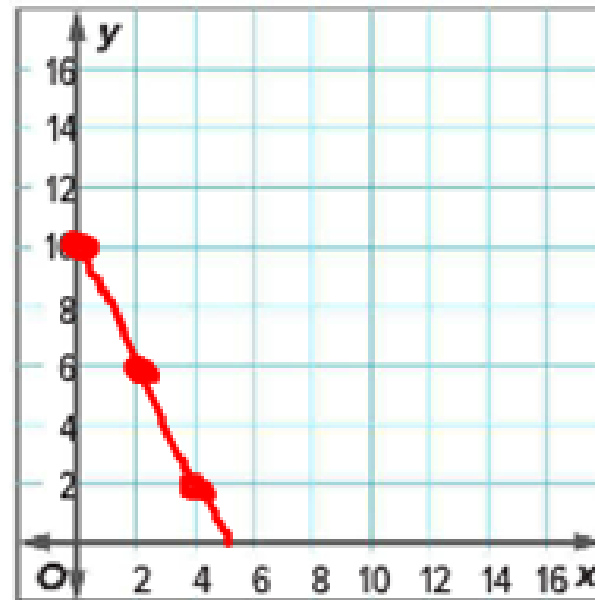
Discrete (Looking @ Input)
Domain can't be partial amount.

Continuous
Domain can be partial

Got it? Do this problem to find out.

- a. The farmer's market sells apples for \$2 per pound and oranges for \$1 per pound. Marjorie has \$10 to spend. The function $y = 10 - 2x$ represents the number of apples x and oranges y Marjorie can purchase. Graph the function and interpret the points graphed.

lbs of oranges



lbs of apples

x → lbs of apples
y → lbs of oranges

$$b = 10$$
$$m = -2$$

Example



2. Graph $y = x + 2$.

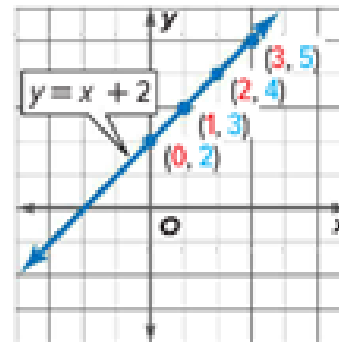
Step 1

Make a function table. Select any four values for the domain x . Substitute these values for x to find the value of y , and write the corresponding ordered pairs.

x	$x + 2$	y	(x, y)
0	$0 + 2$	2	(0, 2)
1	$1 + 2$	3	(1, 3)
2	$2 + 2$	4	(2, 4)
3	$3 + 2$	5	(3, 5)

Step 2

Graph each ordered pair. Draw a line that passes through each point.



The line is the complete graph of the function. The ordered pair corresponding to any point on the line is a solution of the equation $y = x + 2$.

Check It appears that $(-2, 0)$ is also a solution. Check this by substitution.

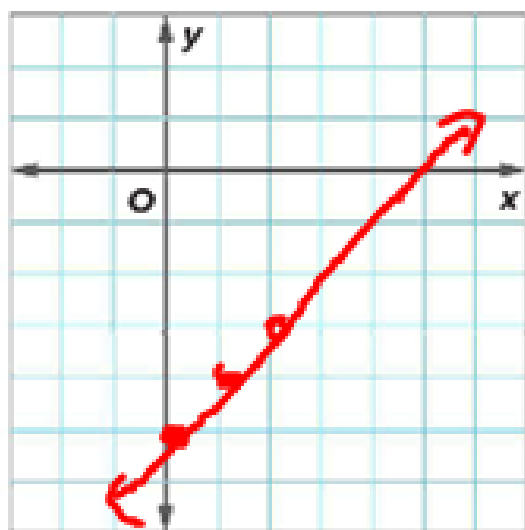
$$y = x + 2 \quad \text{Write the function.}$$

$$0 \stackrel{?}{=} -2 + 2 \quad \text{Replace } x \text{ with } -2 \text{ and } y \text{ with } 0.$$

$$0 = 0 \quad \checkmark \quad \text{Simplify.}$$

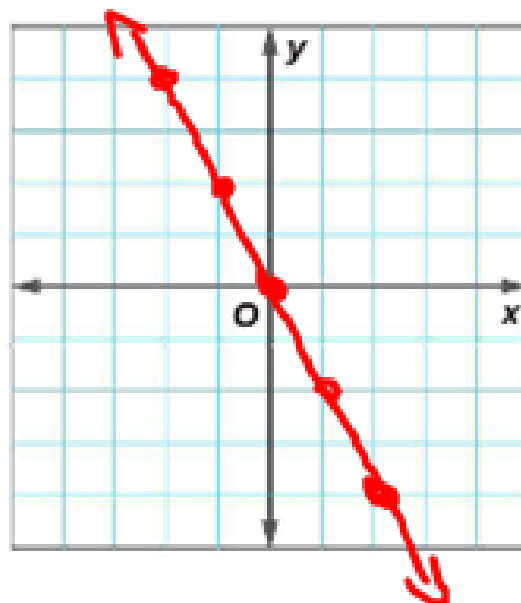
Got it? Do these problems to find out.

b. $y = x - 5$



x	y
0	-5
1	-4
2	-3
3	-2
4	-1
5	0

c. $y = -2x$



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

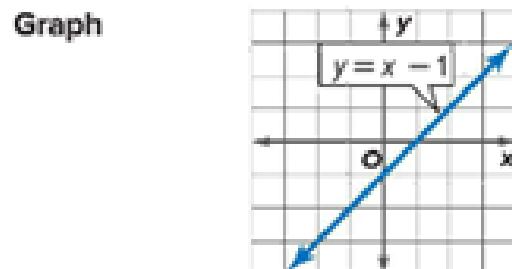
Representing Functions

Words The value of y is one less than the corresponding value of x .

Equation $y = x - 1$ **Ordered Pairs** $(0, -1), (1, 0), (2, 1), (3, 2)$

Table

x	y
0	-1
1	0
2	1
3	2



A **linear function** is a function in which the graph of the solutions forms a straight line. Therefore, an equation of the form $y = mx + b$ is a *linear function*.

A function can be considered continuous or discrete. **Continuous data** can take on any value, so there is no space between data values for a given domain. **Discrete data** have space between possible data values. Graphs of continuous data are represented by solid lines and graphs of discrete data are represented by dots.

Continuous Data	Discrete Data
the number of ounces in a glass	the number of glasses in a cupboard
the weight of each chocolate chip	the number of chocolate chips in a bag

You can determine if data that model real-world situations are discrete or continuous by considering whether all numbers are reasonable as part of the domain.



Examples



Each person that enters a store receives a coupon for \$5 off his or her entire purchase.

- 3.** Write a function to represent the total value of the coupons given out.

Let y represent the total value of the coupons and x represent the number of people. The function is $y = 5x$.

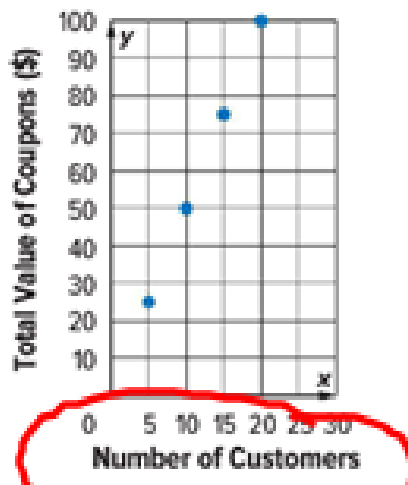
- 4.** Make a function table to find the total value of the coupons given out to 5, 10, 15, and 20 customers.

x	$5x$	y
5	$5(5)$	25
10	$5(10)$	50
15	$5(15)$	75
20	$5(20)$	100

- 5.** Graph the function. Is the function continuous or discrete? Explain.

Use the ordered pairs from the function table to graph the function.

There can only be a whole number amount of customers. The function is discrete. So, the points are not connected.



Got it? Do these problems to find out.

A store sells assorted nuts for \$5.95 per pound.

$$y = 5.95x$$

d. Write a function to represent the total cost of any number of pounds of nuts.

$x = \#$ of pounds $y =$ total cost

e. Complete the function table below to find the total cost of 1, 2, 3, 4, or 5 pounds of nuts.

f. Graph the function. Is the function continuous or discrete? Explain.

Continuous, you can have part of a pound.

x	$5.95x$	y
1	$5.95(1)$	5.95 (1, 5.95)
2	$5.95(2)$	11.90 (2, 11.9)
3	$5.95(3)$	17.85
4	$5.95(4)$	23.80
5	$5.95(5)$	29.75

