

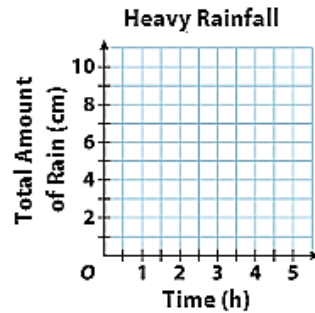
## Lesson: Functions (Day 3) [Linear Functions, Non-Linear Functions and Comparing of Functions]

### Creating and Working with Linear Functions

The U.S. Department of Agriculture defines heavy rain as rain that falls at a rate of 1.5 centimeters per hour.

The table shows the total amount of rain that falls in various amounts of time during a heavy rain. Complete the table.

Time (h)	0	1	2	3	4	5
Total Amount of Rain (cm)	0	1.5				

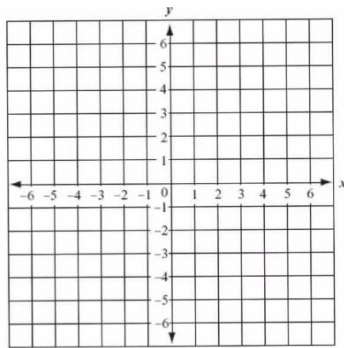


Plot the points from the table on the graph provided. To make things a little easier plot only the even hours.

Is the total amount of rain that falls a function of the number of hours that rain has been falling? Why or why not?

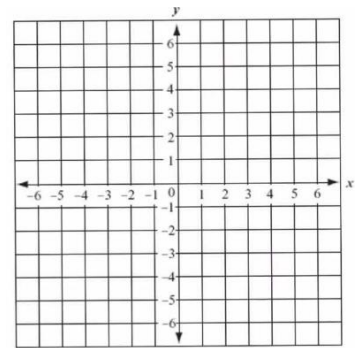
A **linear function** will be a straight line and have a constant rate of change or slope.

x	$y = -2x - 6$	y
-6		
-4		
-2		
0		
2		
4		



A Linear Function

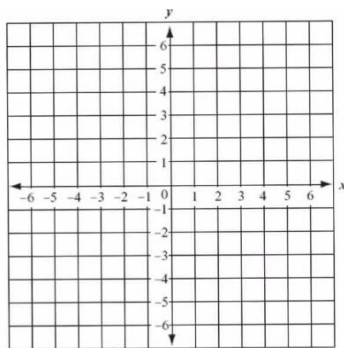
x	$y = 3x + 3$	y
-2		
-1		
0		
1		
2		
3		



A Linear Function

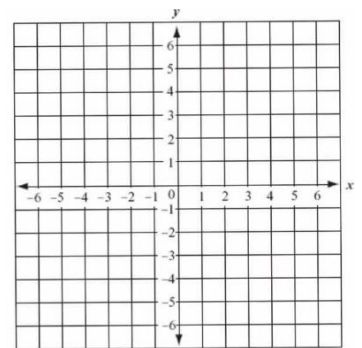
A **non-linear function** will not be a straight line and will not have a constant rate of change or slope.

x	$y = x^2$	y
-2		
-1		
0		
1		
2		
3		



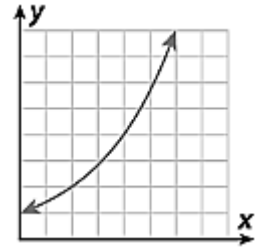
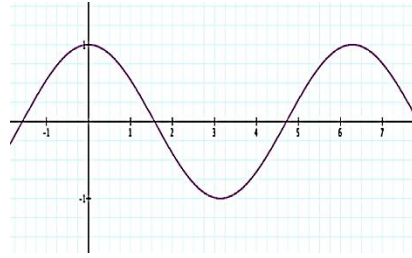
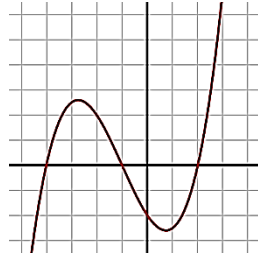
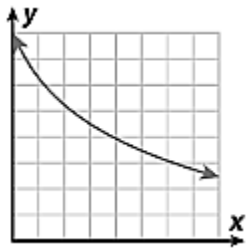
A Non-Linear Function

x	$y = 2 - x^2$	y
-2		
-1		
0		
1		
2		
3		



A Non-Linear Function

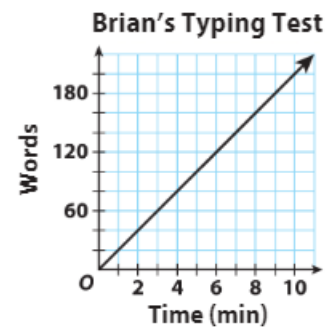
Here are some more examples of **non-linear functions**. These graphs are **not a straight line**.



## Comparing Linear Functions

The table and graph show how many words Morgan and Brian typed correctly on a typing test. For both students, the relationship between words typed correctly and time is linear.

Morgan's Typing Test					
Time (min)	2	4	6	8	10
Words	30	60	90	120	150



**A** Find Morgan's unit rate.

**B** Find Brian's unit rate.

**C** Which student types more correct words per minute?

Jamal wants to buy a new game system that costs \$200. He does not have enough money to buy it today, so he compares layaway plans at different stores.

The plan at Store A is shown on the graph.



**A** Write an equation in slope-intercept form for Store A's layaway plan. Let  $x$  represent number of weeks and  $y$  represent balance owed.

\_\_\_\_\_

**B** Write an equation in slope-intercept form for Store B's layaway plan. Let  $x$  represent number of weeks and  $y$  represent balance owed.

\_\_\_\_\_

Store B requires an initial payment of \$60 and weekly payments of \$20 until the balance is paid in full.

**F** Which plan allows Jamal to pay for the game system faster? Explain.