

Lesson Summary

One way to determine if a function is linear or nonlinear is to inspect average rates of change using a table of values. If these average rates of change are not constant, then the function is not linear.

Another way is to examine the graph of the function. If all the points on the graph do not lie on a common line, then the function is not linear.

If a function is described by an equation different from one equivalent to $y = mx + b$ for some fixed values m and b , then the function is not linear.

Problem Set

1. Consider the function that assigns to each number x the value $x^2 - 4$.

- Do you think the function is linear or nonlinear? Explain.
- Do you expect the graph of this function to be a straight line?
- Develop a list of inputs and matching outputs for this function. Use them to begin a graph of the function.
- Was your prediction to (b) correct?

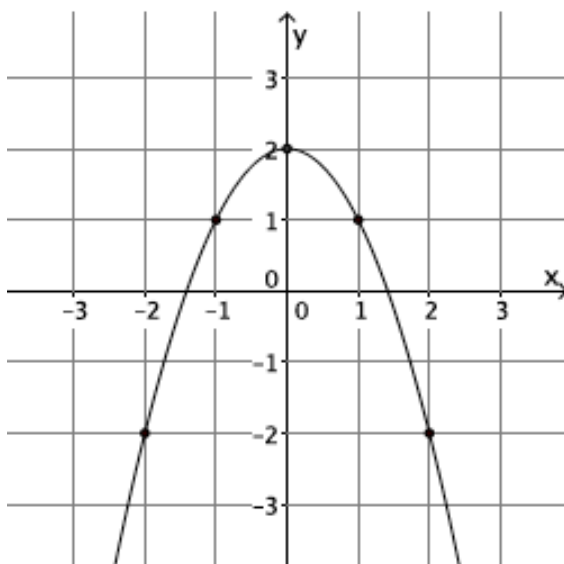
Input (x)	Output ($x^2 - 4$)
-3	
-2	
-1	
0	
1	
2	
3	

2. Consider the function that assigns to each number x greater than -3 the value $\frac{1}{x+3}$.

- Is the function linear or nonlinear? Explain.
- Do you expect the graph of this function to be a straight line?
- Develop a list of inputs and matching outputs for this function. Use them to begin a graph of the function.
- Was your prediction to (b) correct?

Input (x)	Output ($\frac{1}{x+3}$)
-2	
-1	
0	
1	
2	
3	

- 3.
- a. Is the function represented by this graph linear or nonlinear? Briefly justify your answer.



- b. What is the average rate of change for this function from an input of $x = -2$ to an input of $x = -1$?
- c. What is the average rate of change for this function from an input of $x = -1$ to an input of $x = 0$?