

## Lesson 6: Graphs of Linear Functions and Rate of Change

### Classwork

#### Opening Exercise

Functions 1, 2, and 3 have the tables shown below. Examine each of them and make a conjecture about which will be linear and justify your claim.

Input	Output
2	5
4	7
5	8
8	11

Input	Output
2	4
3	9
4	16
5	25

Input	Output
0	-3
1	1
2	6
3	9

**Exercise**

A function assigns the inputs and corresponding outputs shown in the table below.

Input	Output
1	2
2	-1
4	-7
6	-13

- Is the function a linear function? Check at least three pairs of inputs and their corresponding outputs.
- What equation describes the function?
- What will the graph of the function look like? Explain.

### Lesson Summary

When the rate of change is constant for pairs of inputs and their corresponding outputs, the function is a linear function.

We can write linear equations in the form of  $y = mx + b$  to express a linear function.

From the last lesson we know that the graph of a function is the same as the graph of the equation that describes it. When a function can be described by the linear equation  $y = mx + b$ , the graph of the function will be a line because the graph of the equation  $y = mx + b$  is a line.

### Problem Set

1. A function assigns the inputs and corresponding outputs shown in the table below.

Input	Output
3	9
9	17
12	21
15	25

- Is the function a linear function? Check at least three pairs of inputs and their corresponding outputs.
  - What equation describes the function?
  - What will the graph of the function look like? Explain.
2. A function assigns the inputs and corresponding outputs shown in the table below.

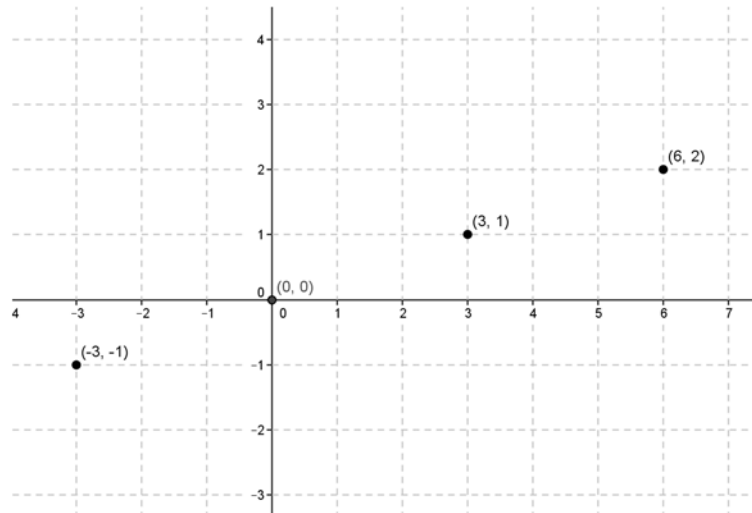
Input	Output
-1	2
0	0
1	2
2	8
3	18

- Is the function a linear function?
  - What equation describes the function?
3. A function assigns the inputs and corresponding outputs shown in the table below.

Input	Output
0.2	2
0.6	6
1.5	15
2.1	21

- Is the function a linear function? Check at least three pairs of inputs and their corresponding outputs.
- What equation describes the function?
- What will the graph of the function look like? Explain.

4. Martin says that you only need to check the first and last input and output values to determine if the function is linear. Is he correct? Explain. Hint: Show an example with a table that is not a function.
5. Is the following graph a graph of a linear function? How would you determine if it is a linear function?



6. A function assigns the inputs and corresponding outputs shown in the table below.

Input	Output
-6	-6
-5	-5
-4	-4
-2	-2

- a. Is the function a linear function? Check at least three pairs of inputs and their corresponding outputs.
- b. What equation describes the function?
- c. What will the graph of the function look like? Explain.