Lesson 2.4.1: Illustrating Linear Functions

Linear Function: a function whose graph is a slant line. It is in the form of $f(x) = mx + b$ or $y = mx + b$ where:

- $f(x)$ or y is the dependent variable;
- x is the independent variable which we manipulate to get different results of y;
- m is the slope of the line;
- b is the constant term or the y-intercept;
- m and b are real numbers.

If $m \neq 0$, then the degree of the function is 1.
If $m = 0$ and $b \neq 0$, then the degree is 0.
If $m = 0$ and $b = 0$, then the degree is not defined.
Function Notation: If f is a function, the symbol $f(x)$, read as "f of x," is used to denote the value of the function f at a given value of x .

Practice Exercises 2.4.1

A. Write Yes if the function is a linear function or No if it is not. If it is a linear function, determine the slope, y-intercept, and degree.

1. $f(x) = 5x + 1$
2. $f(x) = 3x$
3. $f(x) = -5$
4. $f(x) = -(x + 5)$
5. $f(x) = 10x^2 + 7x$

B. Determine whether the function below is linear given the table.

1.

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

2.

x	-2	-1	0	1	2
y	1	0	1	4	9

3.

x	-2	0	2	4	6
y	4	-2	-4	-2	4

4.

x	5	4	3	2	1
y	-1	2	5	8	11

5.

x	-2	-1	0	1	2
y	5	2	-1	-4	-7

C. Evaluate the following function notations.

1. If $f(x) = 2x - 3$, find:
   a. $f(0)$
   b. $f(-1)$
   c. $f(\frac{1}{2})$
2. If $f(x) = x - 1$, find:
   a. $f(1)$
   b. $f(-2)$
   c. $f(\frac{1}{3})$
3. If $f(x) = \frac{1}{3}x + 1$, find:
   a. $f(6)$
   b. $f(-3)$
   c. $f(\frac{3}{4})$

Activity 2.4.1

A. Write Yes if the function is a linear function or No if it is not. If it is a linear function, determine the slope, y-intercept, and degree.

1. $f(x) = -6x - 7$
2. $f(x) = -4$
3. $f(x) = 2(x - 3)$
4. $f(x) = -4x^2$
5. $f(x) = 0$

B. Determine whether the function below is linear given the table.

1.

x	-3	-1	1	3	5
y	-16	-6	4	14	24

2.

x	-5	-4	-3	-2	-1
y	15	11	7	3	-1

3.

x	-2	-1	0	1	2
y	-1	2	5	8	11

4.

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

5.

x	-2	-1	0	1	2
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C. Evaluate the following function notations.

1. If $f(x) = 4x - 1$, find:
   a. $f(0)$
   b. $f(-1)$
   c. $f(\frac{1}{2})$
2. If $f(x) = -2x + 3$, find:
   a. $f(1)$
   b. $f(-2)$
   c. $f(\frac{3}{2})$
3. If $f(x) = \frac{3}{2}x + 1$, find:
   a. $f(2)$
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