

**Lesson Summary**

A linear equation  $y = mx + b$  describes a rule for a function. We call any function defined by a linear equation a linear function.

Problems involving a constant rate of change or a proportional relationship can be described by linear functions.

**Problem Set**

1. A food bank distributes cans of vegetables every Saturday. The following table shows the total number of cans they have distributed since the beginning of the year. Assume that this total is a linear function of the number of weeks that have passed.

|  |     |       |       |       |
|--|-----|-------|-------|-------|
| <b>Number of weeks<br/>(<math>x</math>)</b>                                    | 1   | 12    | 20    | 45    |
| <b>Total number of cans of vegetables<br/>distributed<br/>(<math>y</math>)</b> | 180 | 2,160 | 3,600 | 8,100 |

- Describe the function being considered in words.
  - Write the linear equation that describes the total number of cans handed out,  $y$ , in terms of the number of weeks,  $x$ , that have passed.
  - Assume that the food bank wants to distribute 20,000 cans of vegetables. How long will it take them to meet that goal?
  - The manager had forgotten to record that they had distributed 35,000 cans on January 1. Write an adjusted linear equation to reflect this forgotten information.
  - Using your function in part (d), determine how long in years it will take the food bank to hand out 80,000 cans of vegetables.
2. A linear function has the table of values below. It gives the number of miles a plane travels over a given number of hours while flying at a constant speed.

|  |         |       |       |
|--|---------|-------|-------|
| <b>Number of hours traveled<br/>(<math>x</math>)</b> | 2.5     | 4     | 4.2   |
| <b>Distance in miles<br/>(<math>y</math>)</b>        | 1,062.5 | 1,700 | 1,785 |

- Describe in words the function given in this problem.
- Write the equation that gives the distance traveled,  $y$ , in miles, as a linear function of the number of hours,  $x$ , spent flying.
- Assume that the airplane is making a trip from New York to Los Angeles, which is a journey of approximately 2,475 miles. How long will it take the airplane to get to Los Angeles?
- If the airplane flies for 8 hours, how many miles will it cover?

3. A linear function has the table of values below. It gives the number of miles a car travels over a given number of hours.

|  |     |       |     |       |
|--|-----|-------|-----|-------|
| <b>Number of hours traveled<br/>(<math>x</math>)</b> | 3.5 | 3.75  | 4   | 4.25  |
| <b>Distance in miles<br/>(<math>y</math>)</b>        | 203 | 217.5 | 232 | 246.5 |

- Describe in words the function given.
  - Write the equation that gives the distance traveled, in miles, as a linear function of the number of hours spent driving.
  - Assume that the person driving the car is going on a road trip to reach a location 500 miles from her starting point. How long will it take the person to get to the destination?
4. A particular linear function has the table of values below.

|                                    |   |    |   |    |    |    |    |
|------------------------------------|---|----|---|----|----|----|----|
| <b>Input<br/>(<math>x</math>)</b>  | 2 | 3  | 8 | 11 | 15 | 20 | 23 |
| <b>Output<br/>(<math>y</math>)</b> | 7 | 10 |   | 34 |    | 61 |    |

- What is the equation that describes the function?
  - Complete the table using the rule.
5. A particular linear function has the table of values below.

|                                    |   |    |    |    |    |    |    |
|------------------------------------|---|----|----|----|----|----|----|
| <b>Input<br/>(<math>x</math>)</b>  | 0 | 5  | 8  | 13 | 15 | 18 | 21 |
| <b>Output<br/>(<math>y</math>)</b> | 6 | 11 | 14 |    | 21 |    |    |

- What is the rule that describes the function?
- Complete the table using the rule.