

**Lesson Summary**

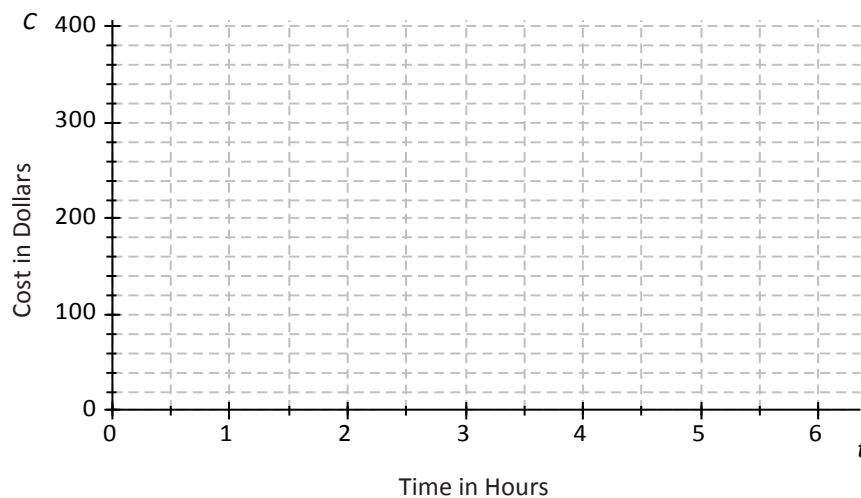
When the rate of change,  $b$ , and an initial value,  $a$ , are given in the context of a problem, the linear function that models the situation is given by the equation  $y = a + bx$ .

The rate of change and initial value can also be used to sketch the graph of the linear function that models the situation.

When two or more ordered pairs are given in the context of a problem that involves a linear relationship, the graph of the linear function is the line that passes through those points. The linear function can be represented by the equation of that line.

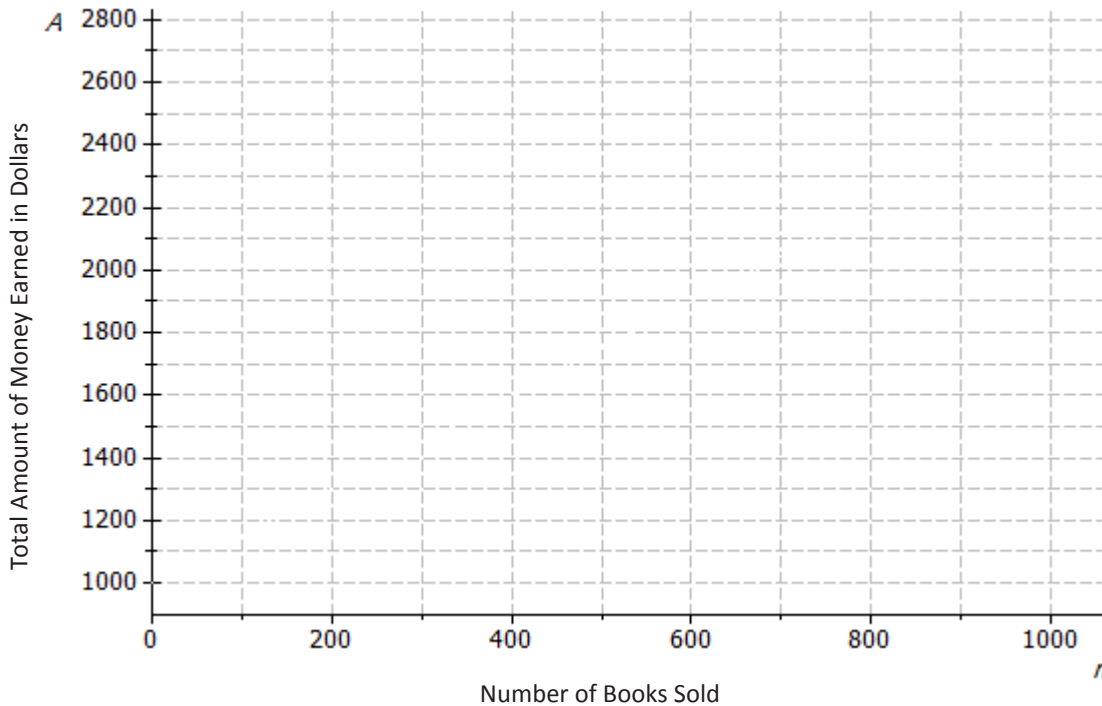
**Problem Set**

1. A plumbing company charges a service fee of \$120, plus \$40 for each hour worked. Sketch the graph of the linear function relating the cost to the customer (in dollars),  $C$ , to the time worked by the plumber (in hours),  $t$ , on the axes below.



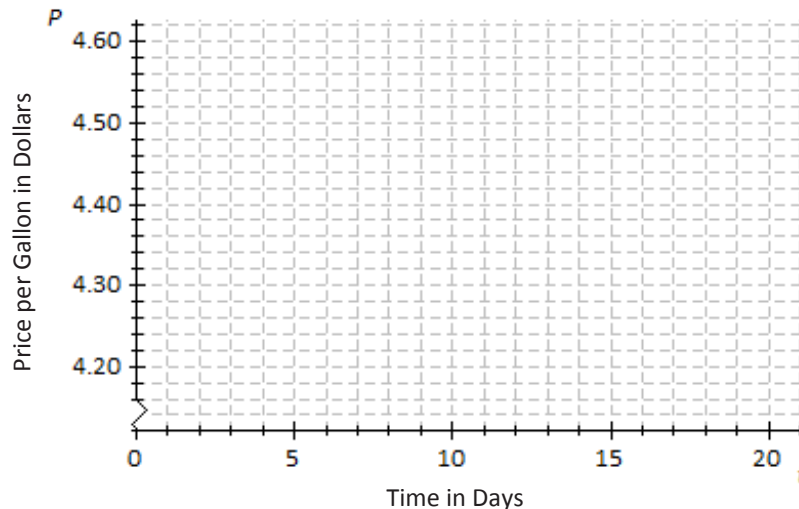
- If the plumber works for 0 hours, what is the cost to the customer? How is this shown on the graph?
- What is the rate of change that relates cost to time?
- Write a linear function that models the relationship between the hours worked and the cost to the customer.
- Find the cost to the customer if the plumber works for each of the following number of hours.
  - 1 hour
  - 2 hours
  - 6 hours
- Plot the points for these times on the coordinate plane, and use a straightedge to draw the line through the points.

2. An author has been paid a writer's fee of \$1,000 plus \$1.50 for every copy of the book that is sold.
- a. Sketch the graph of the linear function that relates the total amount of money earned in dollars,  $A$ , to the number of books sold,  $n$ , on the axes below.



- b. What is the rate of change that relates the total amount of money earned to the number of books sold?
- c. What is the initial value of the linear function based on the graph?
- d. Let the number of books sold be  $n$  and the total amount earned be  $A$ . Construct a linear function that models the relationship between the number of books sold and the total amount earned.

3. Suppose that the price of gasoline has been falling. At the beginning of last month ( $t = 0$ ), the price was \$4.60 per gallon. Twenty days later ( $t = 20$ ), the price was \$4.20 per gallon. Assume that the price per gallon,  $P$ , fell at a constant rate over the twenty days.



- Identify the ordered pairs given in the problem. Plot both points on the coordinate plane above.
- Using a straightedge, draw the line that contains the two points.
- What is the rate of change? What does it mean within the context of the problem?
- What is the function that models the relationship between the number of days and the price per gallon?
- What was the price of gasoline after 9 days?
- After how many days was the price \$4.32?