

charges a party fee plus an additional charge for each guest.

1. Choose two points from the table and find the rate of change.

Sample answer: (3, 59) and (5, 65).

The rate of change is 3.

2. Write a function to represent this situation.

$y = 50 + 3x$

3. Graph the ordered pairs. Then extend the line of the graph until it crosses the y-axis.



1	53
2	56
3	59
4	62
5	65
6	68

$y = mx + b$
slope-intercept
slope y-int.
 $x = 0$

$y = mx + b$
 $(53) = (3)(1) + b$
 $53 = 3 + b$
 $b = 50$

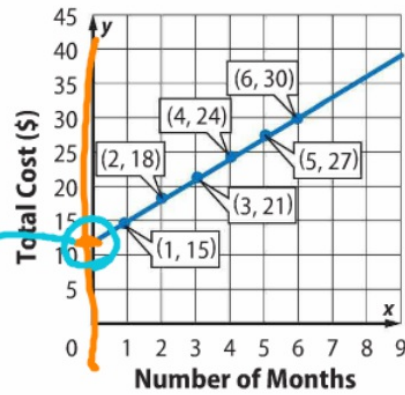
points earned is 30.

Show your work.

a. The monthly fee is \$3. The yearly fee is \$12.

Got It? Do this problem to find out.

a. Music Inc. charges a yearly subscription fee plus a monthly fee. The total cost for different numbers of months, including the yearly fee, is shown in the graph. Find and interpret the rate of change and initial value.



$$m = \frac{\Delta y}{\Delta x} = \frac{3}{1} = 3$$

$$y = 3x + 12$$

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Guided Practice



- As part of a grand opening, an arcade gave out free tokens to the first 100 customers. The graph shows the number of tokens customers received for each dollar spent at the Play More Arcade. Find and interpret rate of change and the initial value. (Example 1)

Show your work.

Each dollar buys 6 tokens. The initial number of

tokens given out is 2.

$$y = mx + b$$

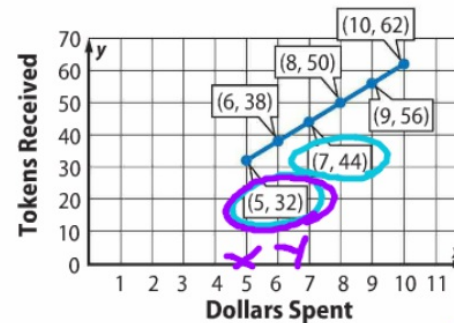
- A historic museum charges a rental fee plus \$2 per hour for an audio tour guide. The total cost for 4 hours is \$12. Find and interpret the rate of change and initial value. (Example 2)

The hourly cost is \$2. The rental fee is \$4.

$$y = mx + b$$

$$12 = (2)(4) + b$$

$$12 = 8 + b$$



$$\frac{44 - 32}{7 - 5} = 6$$

$$\frac{12}{2} = 6$$

$$m = 6$$

$$32 = (6)(5) + b$$

$$32 = 30 + b$$

$$b = 2$$

- A science center charges an initial mem



People	x	2	3	4	5

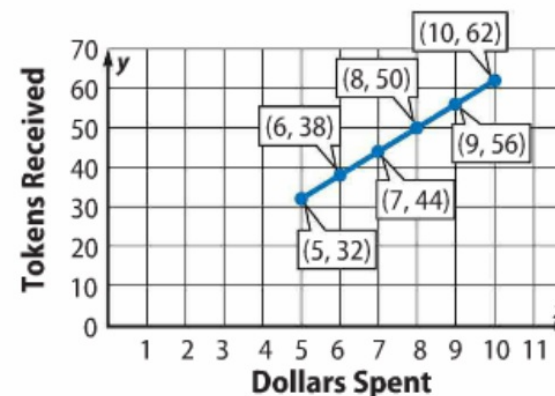
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The hourly cost is \$2. The rental fee is \$4.

3. A science center charges an initial membership fee. The total cost of the membership depends on the number of people on the membership as shown in the table. Assume the relationship between the two quantities is linear. Find and interpret the rate of change and the initial value. (Example 3)

Each person pays an additional \$15. The initial fee is \$35.

Number of People, x	2	3	4	5
Additional Cost (\$), y	65	80	95	110

4.  **Building on the Essential Question** How is the initial value of a function represented in a table and in a graph?

Sample answer: In a table, the initial value of a function is the corresponding y -value when $x = 0$. In a graph, the initial value is the y -intercept.

Rate Yourself!

I understand how to construct functions.



Great! You're ready to move on!

I still have questions about constructing functions.



No Problem! Go online to access a Personal Tutor.



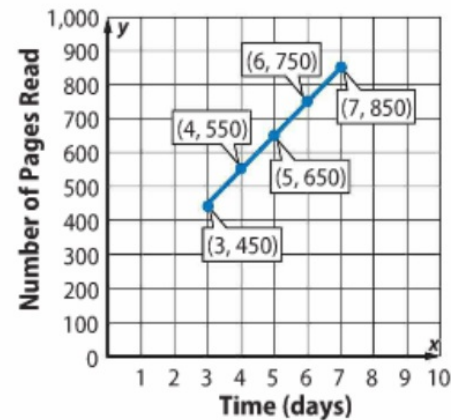
Independent Practice

Go online for Step-by-Step Solutions



- 1** A teacher read part of a book to a class. The graph shows the number of pages read by the teacher over the next several days. Find and interpret the rate of change and the initial value. (Example 1)

The teacher read 100 pages per day. The teacher initially read 150 pages before the graph begins.



- 2.** A water park charges a rental fee plus \$1.50 per hour to rent inflatable rafts. The total cost to rent a raft for 6 hours is \$15. Assume the relationship is linear. Find and interpret the rate of change and the initial value. (Example 2) **The hourly cost is \$1.50. The rental fee is \$6.**

- 3** A teacher already had a certain number of canned goods for the food drive. Each day of the food drive, the class plans to bring in 10 cans. The total number of canned goods for day 10 is 205. Assume the relationship is linear. Find and interpret the rate of change and the initial value. (Example 2)

The class brings in 10 cans per day. The teacher initially had 105 cans.

- 4.** Melissa frosted some cupcakes in the morning for a party. The table shows the total number of cupcakes frosted after she starts up after lunch. Assume the relationship between the two quantities is linear. Find and interpret the rate of change and the initial value. (Example 3)

Time (min), x	5	10	15	20
Number of Cupcakes, y	28	32	36	40

She can frost 0.8 cupcake per minute. She frosted 24 cupcakes in the morning.

- 5.** Jonas has a certain number of DVDs in his collection. The table shows the total number of DVDs in his collection over several months. Assume the relationship between the two quantities is linear. Find and interpret the rate of change and the initial value. (Example 3)

Month, x	3	6	9	12
Number of DVDs, y	18	27	36	45

Each month Jonas adds 3 DVDs. He started with 9 DVDs.

6. **CCSS Multiple Representations** The Coughlin family is driving from Boston to Chicago. The total distance of the trip is 986 miles and each hour they will drive 65 miles.

a. **Algebra** Write an equation to represent the number of remaining miles y after driving any number of hours x .

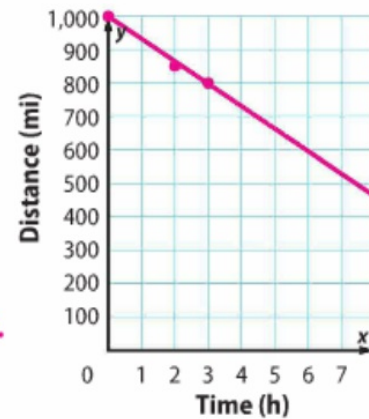
$y = 986 - 65x$

b. **Graphs** Graph the equation from part a on a coordinate plane.

c. **Numbers** What is the rate of change and y -intercept of the line? -65 mph; 986

d. **Words** Explain why the line *slopes down* by 65 for each hour. **Sample answer: The line slopes down by 65 because each hour they travel they have 65 less miles to drive.**

e. **Words** Why does the line cross the y -axis at 986? **They began the trip with 986 miles to drive.**





H.O.T. Problems Higher Order Thinking

7. **CCSS Persevere with Problems** Explain why a horizontal line has a rate of change of zero. **Sample answer: The rate of change is represented by the ratio $\frac{\text{change in } y}{\text{change in } x}$. For a horizontal line, x can increase or decrease, but y does not change. The numerator will be 0, so the rate of change is 0.**
8. **CCSS Model with Mathematics** Write and solve a real-world problem in which you need to find the initial value of a function. Then explain to a classmate how you solved your problem.
See students' work.
9. **CCSS Justify Conclusions** Your teacher asks you to write a linear equation for a function in which the rate of change is -7 and the initial value is -2 . You wrote the equation $y = -7x + (-2)$. Your classmate wrote the equation $y = -7x - 2$. Another classmate wrote the equation $y = (-2) + (-7)x$. Your teacher wrote the equation $y = -2 - 7x$. Who is correct? Justify your response.
They are all correct; Sample answer: The properties of operations show that these four equations are equivalent.