

Remediation

Name _____

Unit 3 Objective 1

Period _____

Identify, describe, and/or use constant rates of change.

Constant rates of change are real-world examples of slope. Examples would be feet per second, days per week, ballots in an envelope, windows in a car, meals for a person, or people for a bus. Notice that there is the word “per”, “for a”, or “in a” between the two parts of the rate of change. Because slope is $\frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$, the first word represents the y-value and the second word represents the x-value. It is also important that the second word is for 1 unit.

Acceptable rates of change would be:

$$35 \text{ miles per hour} = \frac{35 \text{ miles}}{1 \text{ hour}}$$

$$44 \text{ people for a bus} = \frac{44 \text{ people}}{1 \text{ bus}}$$

$$50 \text{ ballots in an envelope} = \frac{50 \text{ ballots}}{1 \text{ envelope}}$$

If there is a fraction, put the whole fraction in the numerator and put 1 in the denominator.

Such as: $7/2 \text{ cookies per person} = \frac{3\frac{1}{2} \text{ cookies}}{1 \text{ person}}$

$$1/3 \text{ feet in a second} = \frac{\frac{1}{3} \text{ feet}}{1 \text{ second}}$$

Example: Sharon is a barber. After 2 days, she cut 15 people’s hair. After 4 days, she cut 25 people’s hair.

A. Identify the constant rate of change.

(2, 15) and (4, 25) are the two points given by the data. It is not (15, 2) and (25, 4). The reason for this is that one would note the day and count how many haircuts were given and not note the haircuts and count how many days it took.

$$\text{Use } m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{25 - 15}{4 - 2} = 5.$$

B. Describe the constant rate of change in haircuts per day.

There were 5 haircuts per day. It was not 5 days per haircut, as that doesn’t make sense.

C. How many haircuts can be done in 7 days?

Since the rate of change is the slope, and therefore the value of m , an equation can be found for the problem.

$$y = mx + b$$

Use $m = 5$ and either one of the points to find b .

$m = 5$ and $(2,15)$, so $x = 2$ and $y = 15$

$$15 = 5 \cdot 2 + b$$

$$b = 5$$

$$y = 5x + 5$$

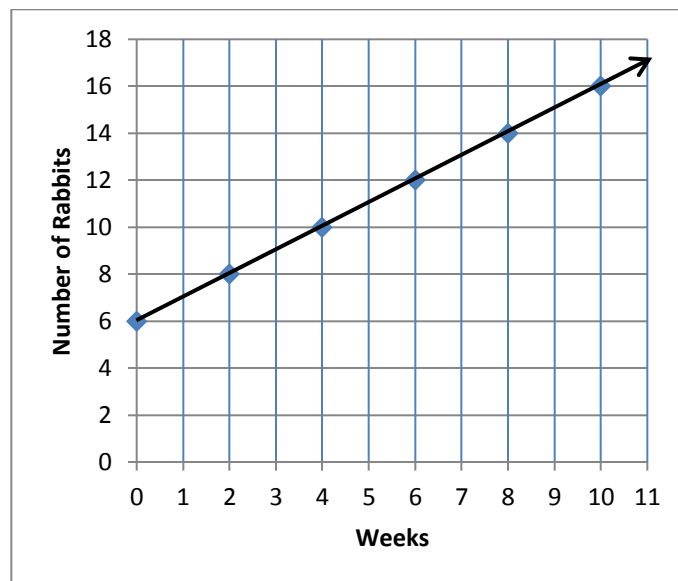
Since days are x -values, put 7 in place of x and find y , which will be the number of haircuts in 7 days.

$$y = 5 \cdot 7 + 5$$

$$y = 40$$

40 haircuts will be done in 7 days.

Example: The graph below shows the number of rabbits in a neighborhood over 10 weeks.



A. Identify the constant rate of change. Use $m = \frac{\text{rise}}{\text{run}} = \frac{2}{2} = 1$

B. Describe the constant rate of change in rabbits per week.
There was one more rabbit in the neighborhood per week.

C. How many rabbits would there be in 20 weeks?

Use $y = mx + b$. The slope is 1 and the graph intersects the y -axis at 6, so the equation is $y = x + 6$. The 20 weeks value is an x -value. Put 20 in for the x -value and solve for y .
 $y = 20 + 6 = 26$ rabbits in 20 weeks.

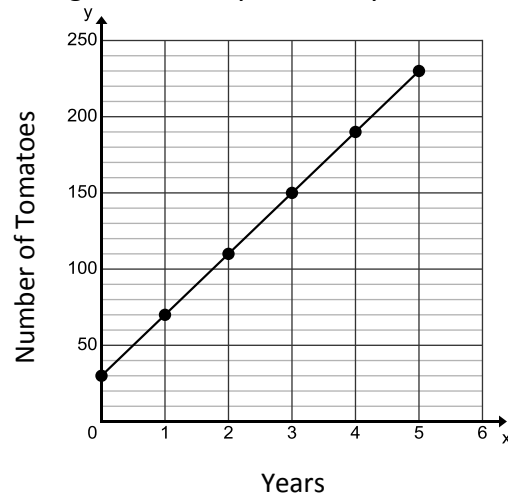
Answer each question. Show all work used to find the answers.

1. Jayla was on a hiking trip. She hiked 41 miles in 2 days and 121 miles in 6 days.
 - A. Identify the constant rate of change.
 - B. Describe the constant rate of change in miles per day.
 - C. How many miles will she hike in 10 days?

2. Yasir was a realtor specializing in selling lots in a new housing development. He sold 17 lots in 2 weeks and 35 lots in 6 weeks.
 - A. Identify the constant rate of change.
 - B. Describe the constant rate of change in lots in a week.
 - C. How many weeks will it take him to sell 53 lots?

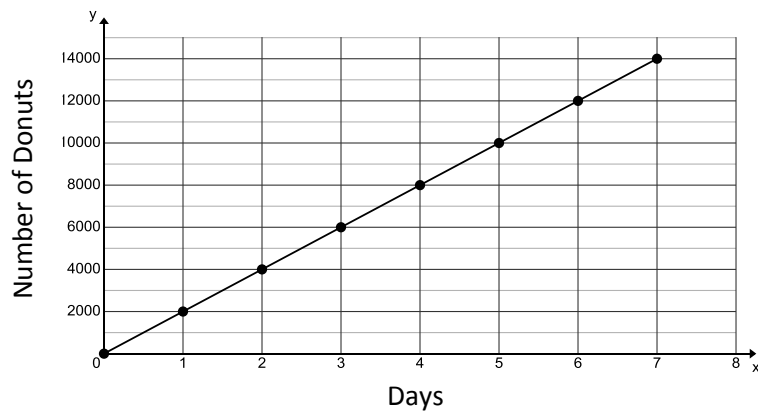
3. Olga planted trees in a park. By the end of the third week, she had planted 56 trees. By the end of the fifth week, she had planted 70 trees.
 - A. Identify the constant rate of change.
 - B. Describe the constant rate of change in trees each week.
 - C. How many trees can she plant in 8 weeks?

4. Tyrone planted a tomato garden each year for 5 years. His results are in the graph below.



- Identify the constant rate of change.
- Describe the constant rate of change in tomatoes per year.
- How many tomatoes will Tyrone grow in 7 years?

5. Mitzel's Bakery makes donuts over 7 days. The data is in the graph below.



- Identify the constant rate of change.
- Describe the constant rate of change in donuts in a day.
- How many days will it take to make 20150 donuts?