

## Lesson 10: A Critical Look at Proportional Relationships

### Classwork

#### Example 1

Paul walks 2 miles in 25 minutes. How many miles can Paul walk in 137.5 minutes?

Time (in minutes)	Distance (in miles)
25	2

**Exercises**

1. Wesley walks at a constant speed from his house to school 1.5 miles away. It took him 25 minutes to get to school.
  - a. What fraction represents his constant speed,  $C$ ?
  
  
  
  
  
  
  
  
  
  
  - b. You want to know how many miles he has walked after 15 minutes. Let  $y$  represent the distance he traveled after 15 minutes of walking at the given constant speed. Write a fraction that represents the constant speed,  $C$ , in terms of  $y$ .
  
  
  
  
  
  
  
  
  
  
  - c. Write the fractions from parts (a) and (b) as a proportion, and solve to find how many miles Wesley walked after 15 minutes.
  
  
  
  
  
  
  
  
  
  
  - d. Let  $y$  be the distance in miles that Wesley traveled after  $x$  minutes. Write a linear equation in two variables that represents how many miles Wesley walked after  $x$  minutes.
  
  
  
  
  
  
  
  
  
  
2. Stefanie drove at a constant speed from her apartment to her friend’s house 20 miles away. It took her 45 minutes to reach her destination.
  - a. What fraction represents her constant speed,  $C$ ?

- b. What fraction represents constant speed,  $C$ , if it takes her  $x$  number of minutes to get halfway to her friend's house?
- c. Write and solve a proportion using the fractions from parts (a) and (b) to determine how many minutes it takes her to get to the halfway point.
- d. Write a two-variable equation to represent how many miles Stefanie can drive over any time interval.
3. The equation that represents how many miles,  $y$ , Dave travels after  $x$  hours is  $y = 50x + 15$ . Use the equation to complete the table below.

$x$ (hours)	Linear Equation: $y = 50x + 15$	$y$ (miles)
1	$y = 50(1) + 15$	65
2		
3		
3.5		
4.1		

**Lesson Summary**

Average speed is found by taking the total distance traveled in a given time interval, divided by the time interval.

If  $y$  is the total distance traveled in a given time interval  $x$ , then  $\frac{y}{x}$  is the average speed.

If we assume the same average speed over any time interval, then we have constant speed, which can then be used to express a linear equation in two variables relating distance and time.

If  $\frac{y}{x} = C$ , where  $C$  is a constant, then you have constant speed.

**Problem Set**

- Eman walks from the store to her friend's house, 2 miles away. It takes her 35 minutes.
  - What fraction represents her constant speed,  $C$ ?
  - Write the fraction that represents her constant speed,  $C$ , if she walks  $y$  miles in 10 minutes.
  - Write and solve a proportion using the fractions from parts (a) and (b) to determine how many miles she walks after 10 minutes. Round your answer to the hundredths place.
  - Write a two-variable equation to represent how many miles Eman can walk over any time interval.
- Erika drives from school to soccer practice 1.3 miles away. It takes her 7 minutes.
  - What fraction represents her constant speed,  $C$ ?
  - What fraction represents her constant speed,  $C$ , if it takes her  $x$  minutes to drive exactly 1 mile?
  - Write and solve a proportion using the fractions from parts (a) and (b) to determine how much time it takes her to drive exactly 1 mile. Round your answer to the tenths place.
  - Write a two-variable equation to represent how many miles Erika can drive over any time interval.
- Darla drives at a constant speed of 45 miles per hour.
  - If she drives for  $y$  miles and it takes her  $x$  hours, write the two-variable equation to represent the number of miles Darla can drive in  $x$  hours.
  - Darla plans to drive to the market 14 miles from her house, then to the post office 3 miles from the market, and then return home, which is 15 miles from the post office. Assuming she drives at a constant speed the entire time, how long will it take her to run her errands and get back home? Round your answer to the hundredths place.
- Aaron walks from his sister's house to his cousin's house, a distance of 4 miles, in 80 minutes. How far does he walk in 30 minutes?

5. Carlos walks 4 miles every night for exercise. It takes him exactly 63 minutes to finish his walk.
- Assuming he walks at a constant rate, write an equation that represents how many miles,  $y$ , Carlos can walk in  $x$  minutes.
  - Use your equation from part (a) to complete the table below. Use a calculator, and round all values to the hundredths place.

$x$ (minutes)	Linear Equation:	$y$ (miles)
15		
30		
40		
60		
75		