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 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 in y: $y = 50x + 15$	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

1. Eman walks from the store to her friend's house, 2 miles away. It takes her 35 minutes.
   a. What fraction represents her constant speed, C?
   b. Write the fraction that represents her constant speed, C, if she walks y miles in 10 minutes.
   c. Write 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.
   d. Write a two-variable equation to represent how many miles Eman can walk over any time interval.

2. Erika drives from school to soccer practice 1.3 miles away. It takes her 7 minutes.
   a. What fraction represents her constant speed, C?
   b. What fraction represents her constant speed, C, if it takes her x minutes to drive exactly 1 mile?
   c. Write 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.
   d. Write a two-variable equation to represent how many miles Erika can drive over any time interval.

3. Darla drives at a constant speed of 45 miles per hour.
   a. 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.
   b. 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 get back home after running her errands? Round your answer to the hundredths place.

4. 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.

   a. Assuming he walks at a constant rate, write an equation that represents how many miles, y, Carlos can walk in x minutes.

   b. 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 in y:	y (miles)
15		
30		
40		
60		
75		