Algebra 2-4: Multiplying Rates

Warm-up
Fill in the chart below.

Rate in Words	Written with a Slash	Written with a Bar
63 words per minute	63words/minute	$\frac{63\text{words}}{1\text{minute}}$
600calories perhour	600 cal/hr	$\frac{600\text{ calories}}{1\text{ hour}}$
65miles per hour	65mi/hr	$\frac{65\text{ miles}}{\text{hr}}$
$2.50 per pound	$2.50/lb	$\frac{\$2.50}{1\text{lb}}$

The above chart includes examples of different ways to write rates.

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Vocabulary	Definition	Examples
Rate	Comparison of 2 quantities	2 apples / bag
Reciprocal Rates	Comparison of 2 quantities but flipped	1 bag / 2 apples

Hints:

Set up blank fractions

Put an = sign.

Label the ending units you want.

Work backwards!

Example Problems

1. You drive an average of 65 mph for 3.5 hours. How far do you travel? miles

$$\frac{65 \text{ miles}}{1 \text{ hr}} \times \frac{3.5 \text{ hrs}}{1} = 227.5 \text{ miles}$$

2. Convert 3 hours to minutes using reciprocal rates.

$$\frac{3 \text{ hours}}{1} \times \frac{60 \text{ min}}{1 \text{ hr}} = 180 \text{ minutes}$$

3. Convert 3 hours to seconds using reciprocal rates.

$$3 \text{ hrs} \times \frac{60 \text{ min}}{1 \text{ hrs}} \times \frac{60 \text{ sec}}{1 \text{ min}} = 10{,}800 \text{ seconds}$$

4. You drive an average of 65 mph, how far do you travel per second? miles/sec

$$\frac{65 \text{ miles}}{1 \text{ hr}} \times \frac{1 \text{ hr}}{60 \text{ min}} \times \frac{1 \text{ min}}{60 \text{ sec}} = \frac{65 \text{ miles}}{3600 \text{ sec}}$$

$$\frac{65 \text{ miles} \div 3600}{3600 \text{ sec} \div 3600} = .02 \text{ mi/sec}$$

5. It takes Felicia 25 minutes to walk one mile. At this rate, how long would it take her to walk 7 miles?

minutes

$$\frac{25 \text{ minutes}}{1 \text{ mile}} \times \frac{7 \text{ miles}}{1} = 175 \text{ minutes}$$

6. Collin drove 450 miles on 15.4 gallons of gas. Compute the mpg (miles per gallon) for his car.

$$\frac{450 \text{ miles}}{15.4 \text{ gal}} \quad \div 15.4 \quad \div 15.4 \quad = \frac{29.2 \text{ mi}}{1 \text{ gal}}$$

7. A 120-gram serving of pudding contains 170 calories in food energy.

a. What is the number of calories per gram

$$\frac{120 \text{ grams}}{170 \text{ calories}} \rightarrow \frac{170 \text{ calories}}{120 \text{ gram}} \quad \div 120 \quad \div 120 \quad = \frac{1.42 \text{ calories}}{1 \text{ gram}}$$

b. A person burns about 5 calories per minute of walking. How long will it take to burn off the calories from a serving of this pudding

minutes

$$\frac{170 \text{ calories}}{1} \times \frac{1 \text{ minute}}{5 \text{ calories}} = \frac{170}{5} = 34 \text{ minutes}$$