

"I Can Solve Real-World Problems by Comparing Rates, Prices, and Units of Measurement."

## Calculating Rates, Speeds and Prices

### Example

An airplane is flying from Boston, MA to San Francisco, CA. What is the speed of the airplane in miles per hour?

Time	Miles Flown
06.5 hours	2,704 miles

### Got It?

A bus travels 70 miles in 2 hours. What is the speed of the bus in miles per hour?

### Example

It costs \$6.54 for 5 balloons. How much would it cost for 12 balloons?

### Got It?

Beth babysits for 3.5 hours and earns \$29.40. How much would she earn if she babysat for 5 hours?

### Example

On a busy road, cars can travel only 5 miles in 10 minutes.

a. At this speed, how far will a car travel in 15 minutes?

b. At this speed, how long will it take a car to travel 20 miles?

## Got It?

On an even busier road, your friend's mother drives 12 miles in 36 minutes. At this speed, how long does it take your friend's mother to drive 2 miles?

When the units don't match up, we have to do some simple conversions before we begin. Let's set up some equivalent rates to answer each question.

### Example

Your aunt drives at a constant speed of 45 miles per hour. How far will your aunt travel in 20 minutes?

### Got It?

Lisa bikes at a constant speed of 8 miles per hour. If she bikes for 30 minutes, how far does she travel?

## Got It?

Your friend plans to bike to school. Your friend bikes at a constant speed of 9 miles per hour and lives 6 miles from school. If your friend leaves home 35 minutes before school starts, will your friend make it to school on time?

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## Calculating Rates, Speeds and Prices

### Example

An airplane is flying from Boston, MA to San Francisco, CA. What is the speed of the airplane in miles per hour?

Time	Miles Flown
06.5 hours	2,704 miles

$$\frac{2704 \text{ miles}}{6.5 \text{ hours}} = \frac{416 \text{ mi}}{1 \text{ hr}}$$

*(Handwritten annotations:  $\div 6.5$  above the fraction bar,  $\div 6.5$  below the fraction bar)*

### Got It?

A bus travels 70 miles in 2 hours. What is the speed of the bus in miles per hour?

$$\frac{70 \text{ miles}}{2 \text{ hrs}} = \frac{35 \text{ miles}}{1 \text{ hr}}$$

*(Handwritten annotations:  $\div 2$  above the fraction bar,  $\div 2$  below the fraction bar)*

### Example

It costs \$6.55 for 5 balloons. How much would it cost for 12 balloons?

$$\frac{\$6.55}{5 \text{ balloons}} = \frac{\$1.31}{1 \text{ balloon}} = \frac{\$15.72}{12 \text{ balloons}}$$

*(Handwritten annotations:  $\div 5$  above the first fraction,  $\div 5$  below the first fraction;  $\times 12$  above the second fraction,  $\times 12$  below the second fraction)*

### Got It?

Beth babysits for 3.5 hours and earns \$29.40. How much would she earn if she babysat for 5 hours?

$$\frac{\$29.40}{3.5 \text{ hrs}} = \frac{\$8.40}{1} = \frac{\$42}{5}$$

*(Handwritten annotations:  $\div 3.5$  above the first fraction,  $\div 3.5$  below the first fraction;  $\times 5$  above the second fraction,  $\times 5$  below the second fraction)*

**\$42 for 5 hrs**

### Example

On a busy road, cars can travel only 5 miles in 10 minutes.

a. At this speed, how far will a car travel in 15 minutes?

b. At this speed, how long will it take a car to travel 20 miles?

$$\frac{5 \text{ mi}}{10 \text{ min}} = \frac{0.5}{1} = \frac{7.5 \text{ mi}}{15 \text{ min}}$$

*(Handwritten annotations:  $\div 10$  above the first fraction,  $\div 10$  below the first fraction;  $\times 15$  above the second fraction,  $\times 15$  below the second fraction)*

$$\frac{5 \text{ mi}}{10 \text{ min}} = \frac{20 \text{ mi}}{40 \text{ min}}$$

*(Handwritten annotations:  $\times 4$  above the second fraction,  $\times 4$  below the second fraction)*

## Got It?

On an even busier road, your friend's mother drives 12 miles in 36 minutes. At this speed, how long does it take your friend's mother to drive 2 miles?

$$\frac{12 \text{ miles}}{36 \text{ min}} = \frac{2 \text{ mi}}{6 \text{ min}}$$

Handwritten annotations: A curved arrow above the fraction points from 12 miles to 2 mi with  $\div 6$  written above it. A curved arrow below the fraction points from 36 min to 6 min with  $\div 6$  written below it. The 6 min in the denominator of the second fraction is circled.

When the units don't match up, we have to do some simple conversions before we begin. Let's set up some equivalent rates to answer each question.

## Example

Your aunt drives at a constant speed of 45 miles per hour. How far will your aunt travel in 20 minutes?

$$\frac{45 \text{ miles}}{60 \text{ minutes}} = \frac{15 \text{ miles}}{20 \text{ minutes}}$$

Handwritten annotations: A curved arrow above the fraction points from 45 miles to 15 miles with  $\div 3$  written above it. A curved arrow below the fraction points from 60 minutes to 20 minutes with  $\div 3$  written below it. The 15 miles in the numerator of the second fraction is circled.

## Got It?

Lisa bikes at a constant speed of 8 miles per hour. If she bikes for 30 minutes, how far does she travel?

$$\frac{8 \text{ miles}}{60 \text{ min}} = \frac{4 \text{ miles}}{30 \text{ min}}$$

Handwritten annotations: A curved arrow above the fraction points from 8 miles to 4 miles with  $\div 2$  written above it. A curved arrow below the fraction points from 60 min to 30 min with  $\div 2$  written below it. The 4 miles in the numerator of the second fraction is circled.

## Got It?

Your friend plans to bike to school. Your friend bikes at a constant speed of 9 miles per hour and lives 6 miles from school. If your friend leaves home 35 minutes before school starts, will your friend make it to school on time?

$$\frac{9 \text{ miles}}{60 \text{ min}} = \frac{0.15 \text{ mi}}{1 \text{ min}} = \frac{5.25 \text{ miles}}{35 \text{ min}}$$

Handwritten annotations: A curved arrow above the first fraction points from 9 miles to 0.15 mi with  $\div 60$  written above it. A curved arrow below the first fraction points from 60 min to 1 min with  $\div 60$  written below it. A curved arrow above the second fraction points from 0.15 mi to 5.25 miles with  $\times 35$  written above it. A curved arrow below the second fraction points from 1 min to 35 min with  $\times 35$  written below it.

She won't make it!