

Unit 7: Ratios, Rates, & Proportions7.2 Rates**Key Words:**

Rate: compares two quantities measured in different units
 ex. \$1.69 per 100g ex. 144 heart beats per 2 minutes

Unit rate: a rate in which the second term is one

ex. \$0.0169/g ex. 72 beats/min ex. 50 km/h

Unit Price: a unit rate used when shopping
 ex. 50¢/apple unit price = cost ÷ amount

Why can a rate be expressed as a fraction but not as a percent?

ex. $\frac{\$1.69}{100g}$ but a percent needs the same unit

ex. Determining Unit Rates

1. Ruby-throated hummingbirds and monarch butterflies travel similar paths across the Gulf of Mexico. The distance is just over 800 km. It takes the hummingbird 18.5 h and the monarch butterfly 42.6 h to cross the gulf.

Distance = speed × Time



a. Estimate the speed of the hummingbird and the butterfly. Calculate the speed of the hummingbird and the butterfly. Give each answer to the nearest hundredth.

	Hummingbird	Butterfly
Estimate Speed $S = \frac{D}{T}$	$\frac{800 \text{ km}}{20 \text{ h}} \approx 40 \text{ km/h}$ units!	$\frac{800 \text{ km}}{40 \text{ h}} \approx 20 \text{ km/h}$
Calculate speed	$\frac{800 \text{ km}}{18.5 \text{ h}} = 43.24 \text{ km/h}$	$\frac{800 \text{ km}}{42.6 \text{ h}} = 18.78 \text{ km/h}$

b. How far would the hummingbird travel in 5 hours?

Distance

$$D = S \times t = 43.24 \times 5 = 216.2 \text{ km}$$

c. How far would the butterfly travel in 150 minutes?

$$D = S \times t$$

$$= 18.78 \times 2.5 = 46.95 \text{ km}$$

SHOW YOU KNOW: Determine the unit rate in each situation.

A. Brandon runs 150 m in 25 sec.

$$150 \text{ m} \div 25 \text{ s} = 6 \text{ m/s}$$

B. Kira earns \$88 for working 8 hours.

$$\$88 \div 8 \text{ h} = \$11/\text{h}$$

C. Cat food costs \$9 for five cans.

$$\$9 \div 5 \text{ cans} = \$1.80/\text{can}$$

unit prices



ex. Comparing Prices Using Unit Rates

Brent went to the grocery store to buy his favourite brand of orange juice. He found the following container sizes and prices. Which container of orange juice is the best buy?

Step 1: Calculate the unit price

Container One:

$$\$1.69 \div 414 \text{ mL} = \$0.00408/\text{mL}$$

Container Two:

$$1.89 \text{ L} \times 1000 = 1890 \text{ mL}$$

$$\$2.99 \div 1890 \text{ mL} = \$0.00316/\text{mL}$$

Container Three:

$$\$5.49 \div 1890 \text{ mL} = \$0.00290/\text{mL}$$

Step 2: Answer the question

The 1.89 L container is the best buy.

SHOW YOU KNOW: At Ed's Grocery, one brand of Salsa is sold in the following container sizes. Which container of salsa is the best buy? Show your work.

$$(A) \$3.44 \div 425 \text{ mL} = \$0.00809/\text{mL}$$

$$(B) \$6.29 \div 642 \text{ mL} = \$0.00979/\text{mL}$$

$$(C) \$15.49 \div 1700 \text{ mL} = \$0.00911/\text{mL}$$



1.7 L
x 1000

The 425 mL Salsa is the best buy