

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

$$\text{unit price} = \text{cost} \div \text{amount}$$

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.



$$\text{Distance} = \text{Speed} \times \text{Time}$$

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.

$$* S = \frac{D}{T}$$

$$T = \frac{D}{S}$$

|                                     | Hummingbird                                                             | Butterfly                                                     |
|-------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------|
| Estimate Speed<br>$S = \frac{D}{T}$ | $\frac{800 \text{ km}}{20 \text{ h}} \approx 40 \text{ km/h}$<br>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



Container One:

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

Container Two:

$$\$2.99 \div 946 \text{ mL} = \$0.00316/\text{mL}$$

Container Three:

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

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

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.

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

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

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



$$1.7 \text{ L} \times 1000$$

The 425 mL Salsa is the best buy