

Date: _____

KEY

2.2 Rate

Tommy plants a pumpkin in his garden and goes away for the summer. When he harvests it 4 months later in October, he finds that it weighs 120 pounds. What was the rate of growth for this pumpkin?

$$\frac{120 \text{ pounds}}{4 \text{ months}}$$

↙ growth over time

↘ pounds per month

$$\Downarrow$$

$$30 \frac{\text{pounds}}{\text{month}}$$

A rate is: a comparison of two numbers (similar to a ratio) that have units.

Sometimes we want to compare two things directly.

We need to measure them in the same number of units:

Choco brand Chocolate milk sells in a 200ml container for \$1.50. Chico brand Chocolate milk sells in a 300ml container for \$2.10. Which is the better buy?

Solution:

$$\frac{\$1.50}{200 \text{ mL}} \quad \Downarrow \quad \frac{\$0.75}{100 \text{ mL}}$$

$$\frac{\$2.10}{300 \text{ mL}} \quad \Downarrow \quad \frac{\$0.70}{100 \text{ mL}}$$

>

The 300mL container is a better buy.

When finding the better buy, we often use the unit price.

A **unit price** is: the price for 1 unit. This is the result of reducing the denominator to 1, or of simply dividing the numerator by the denominator

Joe shops at bulk foods and buys 4 wild chinook for \$16.45. What is the unit price for each salmon?

$$\frac{\$16.45}{4 \text{ salmon}}$$

$$= \frac{\$4.1125}{1 \text{ salmon}}$$

The unit price is $\approx \$4.11/\text{salmon}$.

Example 1: Yin sells Siu Mai in his deli. His price is \$1.50 per 100grams. How much can Herschel buy if he only has \$5?

① FIND UNIT RATE:

$$\frac{\$1.50}{100 \text{ g}}$$

$$= \$0.015/\text{g}$$

② SOLVE

$$x = \$5 \div \$0.015/\text{g}$$

$$x = 333.33...$$

$$x = 333 \text{ g}$$

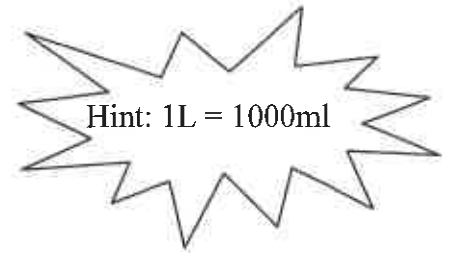
Example 2: Ed's Grocery sells Salsa in big jars. He sells a 1L jar for \$8.70 and a 250ml jar for \$2.40. Which is the better buy?

STRATEGY: COMPARE USING UNIT RATES.

$$\frac{\$8.70}{1000 \text{ mL}} \qquad \frac{\$2.40}{250 \text{ mL}}$$

$$= \$0.0087/\text{mL} < = \$0.0096/\text{mL}$$

The 1L jar is a better buy.



Unit Rate

Speed is an example of a unit rate.

Hourly wages are an example of a unit rate.

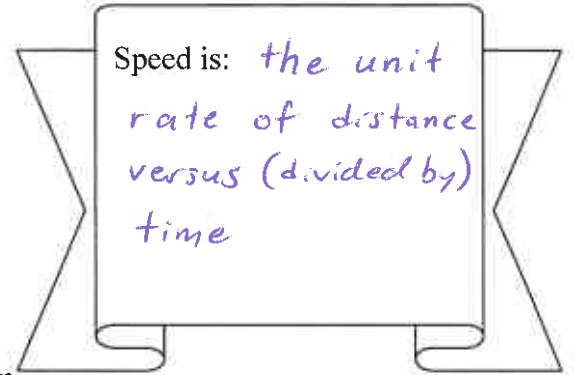
Example:

Rate:

Sarah earns \$20 in
4 hours babysitting

Unit Rate:

Sarah earns \$5 per hour
babysitting for 4 hours.



What do you think is the difference between a *Rate* and a *Unit Rate*?

- * A rate can have any number as the denominator
- * A unit rate must have one as the denominator

A unit rate is: a rate in which the denominator is one. This allows it to be written as a single number.

The Chelephant is the fastest land mammal in the world, and can run for up to 5 hours at its top speed. If it can run 214 kilometers, what is its speed in km/h?

$$\frac{214 \text{ km}}{5 \text{ hr}}$$

$$= 42.8 \frac{\text{km}}{\text{hr}}$$

Show you know:

Alan is buying socks. A package of 3 pairs of socks costs \$14. What is the unit price per pair?

$$\hookrightarrow \frac{\$}{\text{pair}}$$

$$\frac{\$14}{3 \text{ pairs}}$$

$$= 4.6666\dots$$

$$= \$4.67/\text{pair}$$