Rates and Unit Price

Objective 1

Understand the meaning of Rates and Unit Price

Remember that a ratio compares two quantities. For example, the ratio of 3 to 4 can be written as $\frac{3}{4}$.

A **rate** is compares two quantities and we write in the units. The two quantities have different units.

For example $\frac{110 \text{ miles}}{2 \text{ hours}}$ or $\frac{76 \text{ miles}}{2 \text{ gallons}}$ are considered to be rates since we included the units.

A **unit rate** is a rate with a denominator of 1. For example, if we reduce the rate $\frac{110 \text{ miles}}{2 \text{ hours}}$ to $\frac{55 \text{ miles}}{1 \text{ hour}}$, we call this a unit rate and write 55 miles/hour or 55 mph.

Similarly, if we reduce $\frac{76 \text{ miles}}{2 \text{ gallons}}$ to $\frac{38 \text{ miles}}{1 \text{ gallon}}$, we also call this a unit rate and write 38 miles/gallon or 38 mpg.

Example 1: A car travels at a rate of 200 miles per 4 hours. What is the cars unit rate in miles per hour?

$$\frac{200 \text{ miles}}{4 \text{ hours}} = \frac{50 \text{ miles}}{1 \text{ hour}} = 50 \text{ miles/hour} = 50 \text{ mph}$$

Example 2: Charlie's scooter can travel 270 miles in 6 gallons of gas. What is the scooters unit rate in miles per gallon?

$$\frac{\text{miles}}{6 \text{ gallons}} = \frac{\text{miles}}{\text{gallon}} = \quad \text{miles/gallon} = \quad \text{mpg}$$

Example 3: In 3 hours, a family traveled 255 kilometers (km). What is the family's unit rate in km per hour?

$$\frac{\text{km}}{3 \text{ hours}} = \frac{\text{km}}{\text{hour}} = \quad \text{km/h}^*$$

* The km/h abbreviation for km per hour is most commonly used.

Example 4: A local farmer's market sells wheat germ at a rate of $2.72 per 16 ounces. What is the unit price in cents per ounce?

$$\frac{2.72 \text{ dollars}}{16 \text{ ounces}} = \frac{272 \text{ cents}}{16 \text{ ounce}} = \quad \text{cents/oz}$$

Unit price between different brands of product can be used to determine the better buy. Most stores display unit price on the price tags now days. Next time you are at the store, take a look at the unit prices. It may save you some money!

Example 5: A home improvement store sells Brand A light bulbs for $4.36 for 4 bulbs. Brand B cost $6.48 for 6 bulbs. Which is the better buy?

Example 6: A department store sells Brand A socks for $6.42 for 6 pairs. Brand B cost $9.72 for 9 pairs. Which is the better buy?

When you receive a paycheck for working part-time, the amount you receive is based on the hours you work and your hourly wage. It is always important that you check to see if you are paid correctly.

Example 7: Candice's time sheet is shown below. If she was paid $391.50 for working these hours, what is her hourly wage?

Monday	Tuesday	Thursday	Friday	Sunday
5.0 hours	4.0 hours	4.0 hours	8.0 hours	8.0 hours