

Unit 18 Ratios and Rates

1. A **ratio** compares two like quantities.

A. The ratio of 3 feet to 1 foot may be expressed three ways.

3 to 1

3:1

$\frac{3}{1}$

B. Like any fraction, the numbers of a ratio may be multiplied or divided by the same number without changing the value of the ratio.

C. Ratios, like fractions, should be simplified (reduced to lowest terms).

1. $\frac{6}{2}$ reduces to $\frac{3}{1}$

2. 3:1 means the first item is three times the size of the second item.

D. The units of measure of a ratio should be the same.

1. Different measurements require one be changed before comparing.

2. Example: Express \$2 to 25 cents as a ratio.

$$\frac{\$2}{25 \text{ cents}} = \frac{200 \text{ cents}}{25 \text{ cents}} = \frac{200 \div 25}{25 \div 25} = \frac{8}{1} \text{ or } 8:1$$

Note: \$2 is 8 times the size of 25 cents.

2. A **rate** is a ratio comparing two unlike quantities.

A. Rates are used to express many important relationships such as:

1. Rate of pay in dollars per hour.

A person making \$48 for 8 hours work expressed as a rate would be

$$\frac{\$48}{8 \text{ hours}} = \frac{\$6}{1 \text{ hour}} \text{ or } \$6 \text{ per hour.}$$

2. Rate of speed in miles per hour.

Traveling 200 miles in 4 hours expressed as a rate would be

$$\frac{200 \text{ miles}}{4 \text{ hours}} = \frac{50 \text{ miles}}{1 \text{ hour}} \text{ or } 50 \text{ miles per hour.}$$

3. Price of food in cost per pound.

Three pounds of hamburger costing \$5.67 expressed as a rate would be

$$\frac{\$5.67}{3 \text{ pounds}} = \frac{\$1.89}{1 \text{ pound}} \text{ or } \$1.89 \text{ per pound.}$$

B. Rates should be reduced.