

Objective: Use dimensional analysis to convert from one rate to another.

What is a Rate?

Examples: $\frac{\text{miles}}{\text{hour}}$ $\frac{\text{cents}}{\text{ounce}}$

Write some other rates and share with your neighbor:

Example: Convert 38 feet/second into miles per hour

1. Write the rate given as a ratio

$$\frac{38 \text{ feet}}{1 \text{ second}}$$

2. Convert the units of the numerator (if needed)

$$\frac{38 \text{ feet}}{1 \text{ second}} \cdot \frac{1 \text{ mile}}{5280 \text{ feet}}$$

3. Convert the units of the denominator (if needed)

$$\frac{38 \text{ feet}}{1 \text{ second}} \cdot \frac{1 \text{ mile}}{5280 \text{ feet}} \cdot \frac{3600 \text{ seconds}}{1 \text{ hour}}$$

4. Cancel dimensions

5. Multiply all numerators then all denominators

$$\frac{136,800 \text{ miles}}{5280 \text{ hours}}$$

6. Divide numerator by denominator to create a "unit rate"

$$25.91 \frac{\text{miles}}{\text{hour}} \quad \text{or} \quad 25.91 \text{ miles per hour}$$

DON'T FORGET TO LABEL YOUR ANSWER

or 25.91 miles/hour

Practice:

1. 55 km/hr to mi/hr
2. 19 quarts/min to cups/min
3. 1.5 yards/min to in/sec
4. 25 km/L to mi/gal
5. 75 mi/hr to ft/sec
6. 320 ft/min to yds/hr
7. 12 fl. oz./day to gal/year