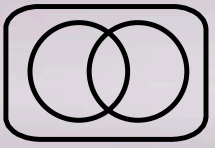
≈ { } √  ∞ Σ π

grams

Math 1030 #3a

ft^2

Units and Conversions

Conversion Factors

meters

°C

Units describe what is being measured or counted.

ex $, inches, ounces, grams, ...

- We can add or subtract quantities only when they have the same units.
- We can multiply and divide quantities even if they have different units.

ex $\frac{\$}{lb}$, $\frac{miles}{hr}$

Unit Conversions are done by multiplying a quantity by the appropriate form of 1. These are called Conversion Factors.

ex Convert 1 mile to yards.

1 mile = 5280 ft, 3 ft = 1 yd

$$1 \text{ mi}\left(\frac{5280 \text{ ft}}{1 \text{ mi}}\right)\left(\frac{1 \text{ yd}}{3 \text{ ft}}\right) = \frac{5280}{3} \text{ yd} = 1760 \text{ yd}$$

EX 1: Convert

a) 24 feet to yards

$$24\,\text{ft}\left(\frac{1\,\text{yd}}{3\,\text{ft}}\right) = \frac{24}{3}\,\text{yd} = 8\,\text{yd}$$

b) 2.5 hours to seconds

$$2.5\,\text{hrs}\left(\frac{60\,\text{min}}{1\,\text{hr}}\right)\left(\frac{60\,\text{sec}}{1\,\text{min}}\right) = 2.5(3600)\,\text{sec} = 9000\,\text{sec}$$

c) 60 miles per hour to feet per minute

$$\frac{60\,\text{mi}}{\text{hr}}\left(\frac{5280\,\text{ft}}{1\,\text{mi}}\right)\left(\frac{1\,\text{hr}}{60\,\text{min}}\right) = 5280\,\text{ft/min}$$

d) 1 ton to ounces

$$1\,\text{ton}\left(\frac{2000\,\text{lb}}{1\,\text{ton}}\right)\left(\frac{16\,\text{oz}}{1\,\text{lb}}\right) = 32000\,\text{oz}$$

e) 12 gallons to quarts

$$12\,\text{gal}\left(\frac{4\,\text{qts}}{1\,\text{gal}}\right) = 48\,\text{qts.}$$

EX 2: Identify the units in each of these.

a) The rate of flow of a river in which 5000 cubic feet of water flow past a particular location every second.

$\frac{ft^3}{sec}$ $\left(\frac{\text{volume}}{\text{time}}\right)$

b) The density of a rock, found by dividing its weight in grams by its volume in cubic centimeters.

$\frac{g}{cm^3}$ $\left(\frac{wt}{\text{volume}}\right)$

EX 3: Given 1 meter = 100 centimeters, find a conversion between square meters and square centimeters.

$$\frac{1\ m}{100\ cm}\left(\frac{1\ m}{100\ cm}\right) = \frac{1}{100^2}\frac{m^2}{cm^2}$$

$$= \frac{1}{10{,}000}\ m^2/cm^2$$

$$1\ m^2 = 10000\ cm^2$$