NOTES PACKET

Date_____

Guided Notes: Dimensional Analysis

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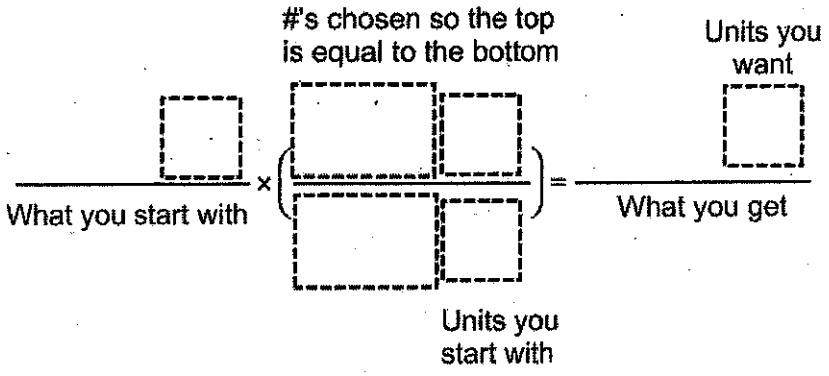
Dimensional Analysis

A method used to make unit conversions



Mount Everest, the tallest mountain on the Earth, is 29, 028 ft high. What is its height in miles? Round to the nearest thousandths.

$$\frac{29,028\ \text{ft}}{} \times \left(\frac{1\ \text{mi}}{5280\ \text{ft}}\right) = \frac{\quad\text{mi}}{}$$

What is its height in meters?

1 ft → .305 M

$$\frac{29,028\ \text{ft}}{} \times \left(\frac{.305\ \text{m}}{1\ \text{ft}}\right) = \frac{\quad\text{m}}{}$$

7.3 m = _____cm

(1 m = 100 cm)

$$\frac{7.3\ \text{m}}{} \times \left(\frac{100\ \text{cm}}{1\ \text{m}}\right) = \frac{\quad\text{cm}}{}$$

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Convert 200 lbs to kg
(Round to the nearest tenth.)
(1 kg = 2.2 lbs)

$$\frac{200\text{ lbs}}{} \times \left(\frac{1\text{ kg}}{2.2\text{ lbs}}\right) = \frac{90.9\text{ kg}}{}$$

Convert $50 into ¥ (yen)

($1 = 90¥)

$$\frac{50\ \$}{} \times \left(\frac{90\ ¥}{1\ \$}\right) = \frac{4500\ ¥}{}$$

One-Step Conversions

1. Houston Rockets basketball player, Yao Ming, is about 7.5 feet tall. How tall is he in inches?

$$\frac{7.5\text{ ft}}{1} \times \frac{12\text{ in}}{1\text{ ft}} = \boxed{90\text{ in}}$$

2. Using the height in inches from problem 1, convert Yao's height to centimeters.

$$\frac{90\text{ in}}{1} \times \frac{2.54\text{ cm}}{1\text{ in}} = \boxed{228.6\text{ cm}}$$

1 in → 2.54 cm

Multi-Step Conversions

*Each of the calculations in Problems 1 and 2 were single-step conversions. We can combine these two problems to make one multi-step problem.

3. Use the following multi-step setup to convert Yao Ming's height from feet to centimeters. (What units should be at the beginning? What units should be at the end?)

$$\text{——} \cdot \left(\text{——}\right) \cdot \left(\text{——}\right) = \text{——}$$

Unit Conversions Homework

- 5280 feet = one mile
- 0.034 ounces = one milliliter
- 0.454 kg = one pound
- 1.6 kilometers = one mile
- 63 gallons = 2 barrels
- 1.06 quarts = one liter
- 4 quarts = one gallon

Do the following one-step unit conversions:

1) Convert 23 miles to feet.

$$\frac{23\ \text{Mi}}{1} \times \frac{5280\ \text{Ft}}{1\ \text{Mi}} = \boxed{121,440\ \text{Ft}}$$

2) Convert 120 lbs to kilograms.

$$\frac{120\ \text{lbs}}{1} \times \frac{0.454\ \text{kg}}{1\ \text{lbs}} = \boxed{54.48\ \text{kg}}$$

3) Convert 451 mL to ounces.

$$\frac{451\ \text{mL}}{1} \times \frac{0.034\ \text{oz}}{1\ \text{mL}} = \boxed{15.334\ \text{oz}}$$

4) Convert 6 feet to miles.

$$\frac{6\ \text{ft}}{1} \times \frac{1\ \text{Mi}}{5280\ \text{ft}} = \boxed{0.00136\ \text{Miles}}$$

5) Convert 4 quarts to liters.

$$\frac{4\ \text{quarts}}{1} \times \frac{1\ \text{L}}{1.05\ \text{quarts}} = \boxed{3.81\ \text{L}}$$

6) Convert .045 barrels to gallons.

$$\frac{0.045\ \text{b}}{1} \times \frac{63\ \text{g}}{2\ \text{b}} = \boxed{1.4175\ \text{g}}$$

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