MTH/SLS-218

Keven Calderon.

Keven.Calderon@CSi.Cuny.edu.

OFFice hours: Zoom

Monday: 4:30pm - 5:30pm

Wednesday: 11:10AM - 12:10pm

Everything will Stay the Same!!

§11.4 Converting One Unit to Another.

1 hour = 60 min.

1 min = 60 sec

1 kg = 2.2 lbs

$3\text{ kg} \stackrel{?}{=} 3(2.2\text{ lbs}) = 6.6\text{ lbs}$.

Example

1 gal = 3.79 L

25 L = ___ gal?

$$\frac{25\text{ L}}{3.79\text{ L}} = 6.6\text{ gal}$$

1 meter = ___ feet?

Know:
- 1 in = 2.54 cm
- 1 m = 100 cm

$$1\text{ m} * \frac{100\text{ cm}}{1\text{ m}} * \frac{1\text{ in}}{2.54\text{ cm}} * \frac{1\text{ ft}}{12\text{ in}}$$

$$1 \cdot 100 \cdot \frac{1}{2.54} \cdot \frac{1}{12} = 3.280839\ldots\text{ ft}.$$

This Chain Process is Known as

Dimensional Analysis

P518

1. A class needs a 175-inch-long piece of rope for a project. How long is the rope in yards?

   a. Use multiplication or division or both to solve the rope problem. Explain your solution.

   b. Describe a number of different correct ways to write the answer to the rope problem. Explain briefly why these different ways of writing the answer mean the same thing.

1 Yard = 3 ft., 1 ft = 12 in.

we have 175 in.

Dimensional Analysis.

$$175\,\text{in} * \frac{1\,\text{ft}}{12\,\text{in}} * \frac{1\,\text{yd}}{3\,\text{ft}}$$

$$\frac{175}{36}\,\text{yd} = 4.86\,\text{yds}$$

$$36\overline{)175}\quad 4\ R31,\quad -144,\quad 31$$

→ 4 yds 31 in

4 yds 2 ft 7 in

1 mile = 5280 ft

1.

a. 100 dolls

b. 1000 dolls

c. 10,000 dolls

d. 100,000 dolls

e. 1 million dolls

f. 1 billion dolls

2. The children in Mrs. Watson's class made chains of small paper dolls, as pictured in Figure 11.18. A chain of 5 dolls is 1 foot long. How long would the following chains of dolls be? In each case, give your answer in either feet or miles, depending on which answer is easiest to understand.

= 12 in.

Figure 11.18 A chain of paper dolls.

(a) 100 dolls.

$* \frac{100 \text{ dolls}}{5 \text{ dolls}} = 20 \text{ ft.}$

$* 100 \text{ dolls} * \frac{1 \text{ ft}}{5 \text{ dolls}} = \frac{100}{5} \text{ ft} = 20 \text{ ft}$

100 dolls = 20 ft

(b) 1000 dolls.

$* 1000 \text{ dolls} * \frac{20 \text{ ft}}{100 \text{ dolls}} = \frac{1000}{100} \cdot 20 \text{ ft}$

$= 200 \text{ ft}$

1000 dolls = 200 ft

(c) 10,000 dolls = 2000 ft.

(d) 100,000 dolls = 20,000 ft. → $\frac{20000}{5280} = 3.8$ miles

3. Solve the following conversion problems, using the basic fact 1 inch = 2.54 cm in each case:

a. A track is 100 meters long. How long is it in feet?

b. If the speed limit is 70 miles per hour, what is it in kilometers per hour?

c. Some farmland covers 2.4 square kilometers. How many square miles is it?

d. Convert the volume of a compost pile, 1 cubic yard, to cubic meters.

e. A man is 1.88 meters tall. How tall is he in feet?

f. How many miles is a 10-kilometer race?

(a) $100\,\text{m} \cdot \frac{100\,\text{cm}}{1\,\text{m}} \cdot \frac{1\,\text{in}}{2.54\,\text{cm}} \cdot \frac{1\,\text{ft}}{12\,\text{in}}$

$\frac{100 \cdot 100}{2.54 \cdot 12} = \frac{10000}{2.54 \times 12} = 328.08\,\text{ft}$

(b) $70\,\frac{\text{mi}}{\text{h}} \cdot \frac{5280\,\text{ft}}{1\,\text{mi}} \cdot \frac{12\,\text{in}}{1\,\text{ft}} \cdot \frac{2.54\,\text{cm}}{1\,\text{in}} \cdot \frac{1\,\text{m}}{100\,\text{cm}} \cdot \frac{1\,\text{km}}{1000\,\text{m}}$

$\frac{70 \times 5280 \times 12 \times 2.54}{100 \times 1000}\,\frac{\text{km}}{\text{h}}$

$= 112.65408\,\frac{\text{km}}{\text{h}}$

$= 113\,\frac{\text{km}}{\text{hr}}$

(c) $2.4\,\text{km}^2 \xrightarrow{\times 100} \text{mi}^2 \div 2.54$

$1\,\text{km} = 1000\,\text{m} = 100{,}000\,\text{cm} = 39370\,\text{in}$

$= 3280\,\text{ft} = 0.621\,\text{miles}$

$\div 12\,\text{in}$ $\div 5280$

$1\,\text{km} = .621\,\text{miles}$

$2.4\,\text{km}^2 * \left(\frac{.621\,\text{mi}}{1\,\text{km}}\right)^2$

$2.4\,\text{km}^2 \times \frac{.39\,\text{mi}^2}{1\,\text{km}^2} = 2.4 \times .39 = .9\,\text{mi}^2$

e. A man is 1.88 meters tall. How tall is he in feet?

$$1.88\ \text{m} \times \frac{100\ \text{cm}}{1\ \text{m}} \times \frac{1\ \text{in}}{2.54\ \text{cm}} \times \frac{1\ \text{ft}}{12\ \text{in}}$$

$$\frac{1.88 \times 100}{(2.54 \times 12)} = 6\ \text{ft}$$

↳ approx. 6.17 ft