

Show All Work To Receive Credit! Conversion factors and prefixes:

$G = 10^9$, $M = 10^6$, $k = 10^3$, $c = 10^{-2}$, $m = 10^{-3}$, $\mu = 10^{-6}$, $n = 10^{-9}$, $p = 10^{-12}$, $2.54 \text{ cm} = 1 \text{ in}$, $1 \text{ km} = 0.6215 \text{ mi}$,
 $12 \text{ in} = 1 \text{ ft}$, $5280 \text{ ft} = 1 \text{ mile}$, $3 \text{ feet} = 1 \text{ yd}$, $60 \text{ sec} = 1 \text{ min}$, $1 \text{ hr} = 60 \text{ min}$, $4 \text{ quarts} = 1 \text{ gal}$, $2 \text{ pints} = 1 \text{ quart}$

1. (9 Pts) Perform each of the following conversions. You must show the complete setup.

a. Convert 437 kg to Gg.

$$\frac{437 \text{ kg}}{10^3} \times \frac{G}{10^9} = 437 \times 10^{-6} \text{ Gg} \text{ or } 4.37 \times 10^{-4} \text{ Gg}$$

b. Convert 333 μL to nL

$$\frac{333 \text{ } \mu\text{L}}{10^{-6}} \times \frac{n}{10^{-9}} = 333 \times 10^3 \text{ nL} \text{ or } 3.33 \times 10^5 \text{ nL}$$

c. Convert 15 miles/hr to km per minute.

$$\frac{15 \text{ mi}}{\text{hr}} \times \frac{5280 \text{ ft}}{1 \text{ mi}} \times \frac{12 \text{ in}}{1 \text{ ft}} \times \frac{2.54 \text{ cm}}{1 \text{ in}} \times \frac{10^{-2} \text{ m}}{1 \text{ cm}} \times \frac{1 \text{ km}}{10^3 \text{ m}} \times \frac{1 \text{ hr}}{60 \text{ min}} = 0.402 \frac{\text{km}}{\text{min}}$$

2. (6 Pts) Assume each of following numbers are measurements. Perform the indicated operations and then report the answer with the proper number of significant figures.

ones place
↓

$$\text{a. } 402.1 \text{ cm} + 83 \text{ cm} + 125.65 \text{ cm} = \underline{610.75} = \underline{611} \text{ cm}$$

3 sig. figs
↓

$$\text{b. } 10.5 \text{ cm} \times 12.10 \text{ cm} \times 18.145 \text{ cm} = \underline{2310} \text{ cm}^3$$

1st step
23.7
78

101.7

$$\text{c. } \frac{(23.7 + 78)}{13.3 \times 2.55} = \frac{101.7}{(13.3 \times 2.55)} = 2.999 = \underline{3.00}$$

3. (5 Pts) A sign measures 188 inches by 55 inches. Determine its area in square cm (cm²) (you may ignore significant figures).

$$\frac{188 \text{ in}}{1 \text{ in}} \times \frac{2.54 \text{ cm}}{1 \text{ in}} \times \frac{55 \text{ in}}{1 \text{ in}} \times \frac{2.54 \text{ cm}}{1 \text{ in}} = \underline{66709.544 \text{ cm}^2}$$

5. (5 Pts) A sample of silver ore was found to contain 0.045 % silver by mass. How many mg of silver can be recovered 170.0 kg of ore?

$$\frac{170.0 \times 10^3 \text{ g ore}}{100 \text{ ore}} \times \frac{0.045 \text{ Ag}}{100} \times \frac{\text{mg}}{10^{-3}} = \underline{76500 \text{ mg Ag}}$$

2 sig figs

KeyShow All Work To Receive Credit! Conversion factors and prefixes:

G = 10^9 , M = 10^6 , k = 10^3 , c = 10^{-2} , m = 10^{-3} , μ = 10^{-6} , n = 10^{-9} , p = 10^{-12} , 2.54 cm = 1 in, 1 km = 0.6215 mi, 12 in = 1 ft, 5280 ft = 1 mile, 3 feet = 1 yd, 60 sec = 1 min, 1 hr = 60 min, 4 quarts = 1 gal, 2 pints = 1 quart

1. (9 Pts) Perform each of the following conversions. You must show the complete setup.

a. Convert 437 Gg to mg.
$$\frac{437 \text{ Gg}}{1 \text{ G}} \times \frac{10^9 \text{ g}}{1 \text{ G}} \times \frac{1 \text{ m}}{10^{-3} \text{ m}} = 437 \times 10^{12} \text{ or } 4.37 \times 10^{14} \text{ mg}$$

b. Convert 333 pL to μ L
$$\frac{333 \text{ pL}}{1 \text{ p}} \times \frac{10^{-12} \text{ L}}{1 \text{ p}} \times \frac{1 \mu}{10^{-6} \mu} = 333 \times 10^{-6} \text{ or } 3.33 \times 10^{-4} \mu\text{L}$$

c. Convert 8 miles/hr to km per minute.

$$\frac{8 \text{ mi}}{1 \text{ hr}} \times \frac{5280 \text{ ft}}{1 \text{ mi}} \times \frac{12 \text{ in}}{1 \text{ ft}} \times \frac{2.54 \text{ cm}}{1 \text{ in}} \times \frac{10^{-2} \text{ m}}{1 \text{ cm}} \times \frac{1 \text{ km}}{10^3 \text{ m}} \times \frac{1 \text{ hr}}{60 \text{ min}} = 0.215 \frac{\text{km}}{\text{min}}$$

2. (6 Pts) Assume each of following numbers are measurements. Perform the indicated operations and then report the answer with the proper number of significant figures.

a. 902.44 cm + 33 cm + 125.2 cm =
$$\begin{array}{r} \text{sig to this place} \\ \downarrow \\ 1060.64 \end{array}$$
 (1061) cm

b. 100.5 cm x 12.100 cm x 18.145 cm =
$$\begin{array}{r} \leftarrow 4 \text{ sig. fig.} \\ 22065 \end{array}$$
 (22070) cm³

c.
$$\frac{(23.2 + 95)}{(13.2 \times 2.53)} = \begin{array}{r} \text{1st step} \\ 23.2 \\ + 95 \\ \hline 118.2 \end{array} \text{ then } \frac{118.2}{(13.2 \times 2.53)} = \begin{array}{r} 118.2 \leftarrow 3 \text{ s.f.} \\ \hline 3.54 \end{array}$$

3. (5 Pts) A sign measures 22 inches by 45 inches. Determine its area in square cm (cm²) (you may ignore significant figures).

A = l x w
$$\frac{22 \text{ in}}{1 \text{ in}} \times \frac{2.54 \text{ cm}}{1 \text{ in}} \times \frac{45 \text{ in}}{1 \text{ in}} \times \frac{2.54 \text{ cm}}{1 \text{ in}} = 6387 \text{ cm}^2$$

5. (5 Pts) A sample of silver ore was found to contain 0.035 % silver by mass. How many mg of silver can be recovered 1070.0 kg of ore?

$$\frac{1070.0 \times 10^3 \text{ g ore}}{100 \text{ ore}} \times \frac{0.035 \text{ Ag}}{100 \text{ ore}} \times \frac{1 \text{ m}}{10^{-3} \text{ m}} = 374500 \text{ mg Ag}$$

$3.745 \times 10^5 \text{ mg Ag}$