

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

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

1. (6 Pts) Perform each of the following conversions. You must show the complete setup.

a. Convert 1055 ng to pg.

$$\frac{1055 \cancel{\text{ng}} | 10^{-9} | \text{P}}{\cancel{\text{ng}} | 10^{-12}} = 1055 \times 10^3 \text{ pg} \text{ or } 1.055 \times 10^6 \text{ pg}$$

b. Convert 898 μL to mL.

$$\frac{898 \cancel{\mu\text{L}} | 10^{-6} | \text{m}}{\cancel{\mu\text{L}} | 10^{-3}} = 898 \times 10^{-3} \text{ mL} \text{ or } 8.98 \times 10^{-1} \text{ mL}$$

2. (4 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. $\frac{(23.8 + 87)}{(14.8 \times 18.73)}$

3 sig figs

$$0.400$$

$$\begin{array}{r} 23.8 \\ + 87 \\ \hline 110.8 \end{array} \leftarrow 3 \text{ sig. fig}$$

b. $10.25 \text{ cm} \times 2.10 \text{ cm} \times 18.195 \text{ cm} =$ 392 cm^3

3 sig fig.

3. (5 Pts) A poster measures 24 in by 35 in. Determine its area in square centimeters (cm^2) (you may ignore significant figures on this one).

$A = l \cdot w$

$$\frac{24 \text{ in} | 35 \text{ in} | 2.54^2 \text{ cm}^2}{1^2 \text{ in}^2} = 5419 \text{ cm}^2$$

4. (5 Pts) A car is traveling at a rate of 75 miles per hour. Determine its speed in kilometers per **minute**. (You may ignore significant figures)?

$$\frac{75 \cancel{\text{mi}} | 5280 \cancel{\text{ft}} | 12 \cancel{\text{in}} | 2.54 \times 10^{-2} \cancel{\text{m}} | \cancel{\text{hr}}}{\cancel{\text{hr}} | 1 \cancel{\text{mi}} | 1 \cancel{\text{ft}} | 1 \cancel{\text{in}} | 10^3 | 60 \text{ min}} = 2.012 \frac{\text{km}}{\text{min}}$$

5. (5 Pts) A sample of silver ore was found to contain 0.45 % silver by mass. How many mg of silver can be recovered 800.0 kg of ore?

$$\frac{800 \times 10^3 \cancel{\text{g ore}} | 0.45 \text{ g Ag} | \text{m}}{100 \cancel{\text{g ore}} | 10^{-3}} = 3.6 \times 10^6 \text{ mg Ag}$$

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

G = 10⁹, M = 10⁶, k = 10³, c = 10⁻², m = 10⁻³, μ = 10⁻⁶, n = 10⁻⁹, p = 10⁻¹², 2.54 cm = 1 in, 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. (6 Pts) Perform each of the following conversions. You must show the complete setup.

a. Convert 905 ng to μg.
$$\frac{905 \cancel{\text{ng}}}{1} \times \frac{10^{-9}}{1} \times \frac{\mu}{10^{-6}} = \frac{905 \times 10^{-3} \mu\text{g}}{1} = 9.05 \times 10^{-1} \mu\text{g}$$

b. Convert 875 nL to pL.
$$\frac{875 \cancel{\text{nL}}}{1} \times \frac{10^{-9}}{1} \times \frac{\text{p}}{10^{-12}} = \frac{875 \times 10^3 \text{ pL}}{1} = 8.75 \times 10^5 \text{ pL}$$

2. (4 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.
$$\frac{(29.988 + 75)}{3.35 \times 12.11} = \frac{2.59}{(3 \text{ sig figs})}$$

$$\begin{array}{r} 29.988 \\ + 75 \\ \hline 104.988 \end{array}$$
 ← gives 3 sig. Fig.

b.
$$1.25 \text{ cm} \times 12.10 \text{ cm} \times 14.145 \text{ cm} = 214 \text{ cm}^3$$
 ← 3 sig fig.

3. (5 Pts) A poster measures 32 in by 36 in. Determine its area in square centimeters (cm²) (you may ignore significant figures on this one).

$$A = l \times w$$

$$A = \frac{32 \cancel{\text{in}}}{1} \times \frac{2.54 \text{ cm}}{1 \cancel{\text{in}}} \times \frac{36 \cancel{\text{in}}}{1} \times \frac{2.54 \text{ cm}}{1 \cancel{\text{in}}} = 7432 \text{ cm}^2$$

4. (5 Pts) A car is traveling at a rate of 68 miles per hour. Determine its speed in kilometers per **minute**. (You may ignore significant figures)?

$$\frac{68 \cancel{\text{miles}}}{\cancel{\text{hr}}} \times \frac{5280 \cancel{\text{ft}}}{1 \cancel{\text{mi}}} \times \frac{12 \cancel{\text{in}}}{1 \cancel{\text{ft}}} \times \frac{2.54 \times 10^{-2} \cancel{\text{m}}}{1 \cancel{\text{in}}} \times \frac{1}{10^3} \times \frac{1}{60 \text{ min}} = 1.82 \frac{\text{km}}{\text{min}}$$

5. (5 Pts) A sample of silver ore was found to contain 0.35 % silver by mass. How many mg of silver can be recovered 735.0 Mg of ore?

$$735.0 \times 10^6 \cancel{\text{g ore}} \times \frac{0.35 \text{ g Ag}}{100 \cancel{\text{g ore}}} \times \frac{\text{m}}{10^{-3}} = 2.57 \times 10^9 \text{ mg Ag}$$