

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

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

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

a. Convert  $88 \mu\text{g}$  to  $\text{ng}$ . 
$$\frac{88 \mu\text{g}}{\mu} \times \frac{10^{-6}}{10^{-9}} = 88 \times 10^3 \text{ ng} \text{ @ } 8.8 \times 10^4 \text{ ng}$$

b. Convert  $85 \text{ mL}$  to  $\mu\text{L}$ . 
$$\frac{85 \text{ mL}}{\text{mL}} \times \frac{10^{-3}}{10^{-6}} = 85 \times 10^3 \mu\text{L} \text{ or } 8.5 \times 10^4 \mu\text{L}$$

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.  $12.145 \text{ cm} + 15.1265 \text{ cm} = 25.12 \text{ cm} = \underline{52.3915} \Rightarrow \underline{52.39 \text{ cm}}$   
 Limited to 0.01 place

b.  $10.25 \text{ cm} \times 2.10 \text{ cm} \times 10.145 \text{ cm} = \underline{218} \text{ cm}^3$   
 3 Sig figs

3. (5 Pts) A poster measures 22 inches by 44 inches. Determine its area in square cm ( $\text{cm}^2$ ) (you may ignore significant figures).

(You may ignore significant figures)  $A = l \cdot w$   

$$\frac{22 \text{ in}}{\text{in}} \times \frac{2.54 \text{ cm}}{\text{in}} \times \frac{44 \text{ in}}{\text{in}} \times \frac{2.54 \text{ cm}}{\text{in}} = \underline{6245 \text{ cm}^2}$$

4. (5 Pts) How many kilo-inches are in 7 miles (You may ignore significant figures)?

$$\frac{7 \text{ mi}}{\text{mi}} \times \frac{5280 \text{ ft}}{1 \text{ ft}} \times \frac{12 \text{ in}}{1 \text{ ft}} \times \frac{1 \text{ k}}{10^3} = 443.52 \text{ k in}$$

5. (5 Pts) A sample of silver ore was found to contain 0.86 % silver by mass. How many mg of silver can be recovered 800.0 kg of ore?

$$\frac{800.0 \text{ kg ore}}{\text{kg}} \times \frac{10^3}{10^{-3}} \times \frac{0.86 \text{ Ag}}{100 \text{ ore}} = 6.88 \times 10^6 \text{ mg Ag}$$

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G = 10<sup>9</sup>, M = 10<sup>6</sup>, k = 10<sup>3</sup>, c = 10<sup>-2</sup>, m = 10<sup>-3</sup>, μ = 10<sup>-6</sup>, n = 10<sup>-9</sup>, 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 327 nL to mL. 
$$\frac{327 \cancel{\text{nL}}}{\cancel{\text{n}}} \times \frac{10^{-9}}{10^{-3}} \frac{\text{m}}{\text{L}} = 327 \times 10^{-6} \text{ or } 3.27 \times 10^{-4} \text{ mL}$$

b. Convert 805 mg to μg. 
$$\frac{805 \cancel{\text{mg}}}{\cancel{\text{m}}} \times \frac{10^{-3}}{10^{-6}} \frac{\mu}{\text{g}} = 805 \times 10^3 \text{ or } 8.05 \times 10^5 \mu\text{g}$$

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. 13.14 cm + 12.526 cm + 0.052 cm = 25.72 cm  
 Limited to 0.01 place

b. 1.2 cm x 6.12 cm x 12.145 cm = 89 cm<sup>3</sup>  
 Limited to 2 sig. figs.

3. (5 Pts) A poster measures 33 inches by 45 inches. Determine its area in square cm (cm<sup>2</sup>). (You may ignore significant figures)

$$\frac{33 \cancel{\text{in}}}{\cancel{\text{in}}} \times \frac{2.54 \text{ cm}}{1 \cancel{\text{in}}} \times \frac{45 \cancel{\text{in}}}{\cancel{\text{in}}} \times \frac{2.54 \text{ cm}}{1 \cancel{\text{in}}} = 9581 \text{ cm}^2$$

4. (5 Pts) How many inches are in 0.5 kilo-miles (You may ignore significant figures)?

$$\frac{0.5 \cancel{\text{km}}}{\cancel{\text{m}}} \times \frac{5280 \text{ ft}}{1 \cancel{\text{mi}}} \times \frac{12 \text{ in}}{1 \cancel{\text{ft}}} \times \frac{10^3}{\cancel{\text{m}}} = 3,168,000 = 3.168 \times 10^7 \text{ in}$$

5. (5 Pts) A sample of silver ore was found to contain 0.086 % silver by mass. How many mg of silver can be recovered 500.0 kg of ore?

$$\frac{500.0 \cancel{\text{kg ore}}}{\cancel{\text{kg}}} \times \frac{10^3}{\cancel{\text{m}}} \frac{\text{m}}{10^{-3}} \times \frac{0.086 \text{ Ag}}{100 \text{ ore}} = 430000 \text{ mg Ag}$$

or  
4.3 x 10<sup>5</sup> mg Ag