

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 57 m watts to p watts. (milli watts to pico watts)

$$\frac{57 \cancel{\text{m}} \text{ WATTS}}{\cancel{\text{m}}} \times \frac{10^{-3}}{1} \times \frac{\text{P}}{10^{-12}} = \underline{57 \times 10^9 \text{ or } 5.7 \times 10^{10} \text{ pwatts}}$$

b. Convert 223 μL to nL. (micro liters to nano liters)

$$\frac{223 \cancel{\mu\text{L}}}{\cancel{\mu}} \times \frac{10^{-6}}{1} \times \frac{\text{n}}{10^{-9}} = \underline{223 \times 10^3 \text{ or } 2.23 \times 10^5 \text{ nL}}$$

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. $(212.145 + 15.1265 + 25.2)/(18.25) = \frac{252.4715}{18.25} = (4 \text{ sig figs}) = \underline{13.83}$

↑
PLACE

b. $10.25 \text{ cm} \times 12.10 \text{ cm} \times 10.145 \text{ cm} = (4 \text{ sig figs}) \underline{1258} \text{ cm}^3$

3. (5 Pts) A poster measures 52 cm by 78 cm. Determine its area in square inches (inches²) (you may ignore significant figures).

$A = l \cdot w$

$$\frac{52 \cancel{\text{cm}}}{2.54 \cancel{\text{cm}}} \times \frac{1 \text{ in}}{1} \times \frac{78 \cancel{\text{cm}}}{2.54 \cancel{\text{cm}}} \times \frac{1 \text{ in}}{1} = \underline{629 \text{ in}^2}$$

4. (5 Pts) How many giga-inches (G inches) are in 12 k-miles (kilo miles)? You may ignore significant figures.

$$\frac{12 \cancel{\text{km}}}{1 \cancel{\text{km}}} \times \frac{10^3}{1} \times \frac{5280 \cancel{\text{ft}}}{1 \cancel{\text{ft}}} \times \frac{12 \cancel{\text{in}}}{1 \cancel{\text{in}}} \times \frac{\text{G}}{10^9} = \underline{0.76 \text{ Gin}}$$

5. (5 Pts) A sample of silver ore was found to contain 0.035 % silver by mass. How many mg (milli grams) of silver can be recovered 900.0 Mg (Mega grams) of ore?

$$\frac{900.0 \cancel{\text{Mg}}}{1 \cancel{\text{Mg}}} \times \frac{10^6}{1} \times \frac{0.035 \text{ Ag}}{100 \cancel{\text{}}} \times \frac{\text{m}}{10^{-3}} = \underline{3.15 \times 10^8 \text{ mg Ag}}$$

$\underline{3.2 \times 10^8 \text{ mg Ag}}$

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

a. Convert 553 pL to mL. (pico liters to milli liters)

$$\frac{553 \text{ pL}}{1} \times \frac{10^{-12} \text{ m}}{1} \times \frac{1 \text{ mL}}{10^{-3} \text{ m}} = 553 \times 10^{-9} \text{ mL} \text{ or } 5.53 \times 10^{-7} \text{ mL}$$

b. Convert 805 μ ounces to c ounces. (micro ounces to centi ounces)

$$\frac{805 \text{ } \mu\text{oz}}{1} \times \frac{10^{-6} \text{ c}}{1} \times \frac{1 \text{ c}}{10^{-2} \text{ c}} = 805 \times 10^{-4} \text{ c} \text{ or } 8.05 \times 10^{-2} \text{ c}$$

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. $(13.1 + 12.526 + 0.052) / (12.25) = \frac{25.678}{12.25} = (3 \text{ s.f.}) = 2.10$

↑
place

b. $1.212 \text{ cm} \times 6.12 \text{ cm} \times 12.145 \text{ cm} = (3 \text{ s.f.}) 90.1 \text{ cm}^3$

3. (5 Pts) A poster measures 85 cm by 105 cm. Determine its area in square inches (inches²). (You may ignore significant figures)

$$A = l \cdot w$$

$$\frac{85 \text{ cm}}{1} \times \frac{1 \text{ in}}{2.54 \text{ cm}} \times \frac{105 \text{ cm}}{1} \times \frac{1 \text{ in}}{2.54 \text{ cm}} = 1383 \text{ in}^2$$

4. (5 Pts) How many Mega-inches (M-inches) are in 25 kilo-miles (k miles)? You may ignore significant figures.

$$\frac{25 \text{ km}}{1} \times \frac{10^3 \text{ ft}}{1 \text{ mi}} \times \frac{5280 \text{ ft}}{1 \text{ ft}} \times \frac{1 \text{ in}}{12 \text{ in}} \times \frac{1 \text{ M}}{10^6} = 1584 \text{ M in}$$

5. (5 Pts) A sample of silver ore was found to contain 0.056 % silver by mass. How many mg (milli grams) of silver can be recovered 500.0 kg (kilograms) of ore?

$$\frac{500.0 \text{ kg ore}}{1} \times \frac{10^3 \text{ g}}{1 \text{ kg}} \times \frac{0.056 \text{ Ag}}{100 \text{ ore}} \times \frac{1 \text{ m}}{10^{-3} \text{ m}} = 280000 \text{ mg Ag}$$

$2.8 \times 10^5 \text{ mg Ag}$