

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

G = 10⁹, M = 10⁶, k = 10³, c = 10⁻², m = 10⁻³, æ = 10⁻⁶, 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

1. (6 Pts) A Car is traveling at a rate of 75 km/hr. How fast is the car going in miles per second?

$$\frac{75 \cancel{\text{km}} \cdot 10^3 \cancel{\text{m}}}{\cancel{\text{hr}} \cdot 10^3} \cdot \frac{1 \cancel{\text{in}}}{2.54 \times 10^{-2} \cancel{\text{m}}} \cdot \frac{1 \cancel{\text{ft}}}{12 \cancel{\text{in}}} \cdot \frac{1 \text{mi}}{5280 \cancel{\text{ft}}} \cdot \frac{1 \text{hr}}{60 \cancel{\text{min}}} \cdot \frac{1 \cancel{\text{min}}}{60 \text{sec}} = 0.01295 \frac{\text{mi}}{\text{sec}}$$

↑
same as centi

2. (4 Pts) Convert each of the following to scientific notation without the use of prefixes:

a. 47 Giga Mega centi dollars = $\frac{4.7 \times 10^{14}}{1}$ dollars or
 $47 \times 10^9 \times 10^6 \times 10^{-2} \text{ \$} = 47 \times 10^{13} \text{ dollars}$

b. 3.0 x 10¹⁰ centimeters = $3.0 \times 10^{10} \times 10^{-2} = 3.0 \times 10^8 \text{ meters}$

3. (5 Pts) A car engine size is listed as 327 cubic inches (in³). What would its size be in Liters?

$$\frac{327 \cancel{\text{in}^3} \cdot 2.54^3 \cancel{\text{cm}^3}}{1^3 \cancel{\text{in}^3}} \cdot \frac{1 \text{mL}}{1 \cancel{\text{cm}^3}} \cdot 10^{-3} = 5.359 \text{ L}$$

4. (5 Pts) A certain chemical procedure requires 105.6 cm of iron wire. How many feet of iron wire are required?

$$\frac{105.6 \cancel{\text{cm}} \cdot 1 \cancel{\text{in}}}{2.54 \cancel{\text{cm}}} \cdot \frac{1 \text{ft}}{12 \cancel{\text{in}}} = 3.465 \text{ ft}$$

5. (5 Pts) A sample of silver ore was found to contain 1.86 % silver by mass. How many grams of silver can be recovered 800.0 kg of ore?

$$\frac{800.0 \times 10^3 \cancel{\text{g ore}} \cdot 1.86 \text{Ag}}{100 \cancel{\text{ore}}} = 14880 \text{ g Ag}$$

Conversion factor: $\frac{1.86 \text{Ag}}{100 \text{ ore}}$

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1. (6 Pts) A Car is traveling at a rate of 105 km/hr. How fast is the car going in miles per minute?

$$\frac{105 \cancel{\text{km}}}{\cancel{\text{hr}}} \times \frac{10^3 \cancel{\text{m}}}{1 \cancel{\text{km}}} \times \frac{1 \cancel{\text{in}}}{2.54 \times 10^{-2} \cancel{\text{m}}} \times \frac{1 \cancel{\text{ft}}}{12 \cancel{\text{in}}} \times \frac{1 \cancel{\text{mi}}}{5280 \cancel{\text{ft}}} \times \frac{1 \cancel{\text{hr}}}{60 \cancel{\text{min}}} = 1.087 \frac{\text{mi}}{\text{hr}}$$

Same as centi

2. (5 Pts) A sample of silver ore was found to contain 1.86 % silver by mass. How many grams of silver can be recovered 800.0 kg of ore?

$$\frac{800.0 \times 10^3 \cancel{\text{g}}}{1000} \times \frac{1.86 \cancel{\%}}{100} = 14880 \text{ g Ag}$$

Conversion factor $\frac{1 \text{ kg Ag}}{1000}$

3. (5 Pts) A car engine size is listed as 351 cubic inches (in³). What would its size be in Liters?

$$\frac{351 \cancel{\text{in}^3}}{1^3 \cancel{\text{in}^3}} \times \frac{2.54^3 \cancel{\text{cm}^3}}{1 \cancel{\text{cm}^3}} \times \frac{1 \cancel{\text{mL}}}{10^{-3} \cancel{\text{L}}} = 5.75 \text{ L}$$

4. (4 Pts) Convert each of the following to scientific notation without the use of prefixes:

a. 47 Giga milli centi dollars = $\frac{10^9 10^{-3} 10^{-2}}{10^9 10^{-3} 10^{-2}}$ 47×10^4 or 4.7×10^5 dollars

b. $3.0 \times 10^{10} \text{ millimeters} = \frac{10^{-3}}{10^{-3}}$ 3.0×10^7 meters

5. (5 Pts) A certain chemical procedure requires 252.6 cm of iron wire. How many feet of iron wire are required?

$$\frac{252.6 \cancel{\text{cm}}}{2.54 \cancel{\text{cm}}} \times \frac{1 \cancel{\text{in}}}{12 \cancel{\text{in}}} = 8.287 \text{ ft}$$