

"I have not failed. I have found 10,000 ways that won't work." - Thomas Edison

**DIMENSIONAL ANALYSIS W/ SCIENTIFIC NOTATION**  
\* Convert the following measurements into the indicated units using dimensional analysis. Write your answer in correct scientific notation form.

1)  $\frac{575 \text{ mm}}{575 \text{ m}} \cdot \frac{1 \text{ m}}{10^3 \text{ mm}} = 10^{-3}$   
 2)  $\frac{1523 \text{ L}}{10^3 \text{ L}} = 1.523 \times 10^{-3}$

3)  $\frac{72 \text{ kg}}{1 \text{ kg}} \cdot \frac{10^3 \text{ g}}{1 \text{ kg}} = 7.2 \times 10^4 \text{ g}$   
 4)  $\frac{7.02 \text{ cm}}{1 \text{ cm}} \cdot \frac{10 \text{ mm}}{1 \text{ cm}} = 7.02 \times 10 = 70.2 \text{ mm}$

5)  $\frac{25 \text{ dm}}{1 \text{ dm}} \cdot \frac{1 \text{ km}}{10^3 \text{ dm}} = 2.5 \times 10^{-4} \text{ km}$   
 6)  $\frac{145 \text{ cm}^3}{1 \text{ cm}^3} \cdot \frac{1 \text{ mL}}{10^3 \text{ cm}^3} = 1.45 \times 10^{-2} \text{ L}$

7)  $\frac{0.0754 \text{ km}}{1 \text{ km}} \cdot \frac{10^3 \text{ m}}{1 \text{ km}} = 7.54 \times 10^3 \text{ m}$   
 8)  $\frac{5.506 \text{ mg}}{10^3 \text{ mg}} \cdot \frac{1 \text{ kg}}{10^3 \text{ g}} = 5.506 \times 10^{-6} \text{ kg}$

9)  $\frac{11143.40 \text{ m}}{1 \text{ m}} \cdot \frac{1 \text{ km}}{10^3 \text{ m}} = 1.11434 \times 10^4 \text{ km}$

10)  $\frac{12.001 \text{ m}^2}{1 \text{ m}^2} \cdot \frac{10^2 \text{ cm}}{1 \text{ m}} \cdot \frac{10^2 \text{ cm}}{1 \text{ m}} = 1.2001 \times 10^4 \text{ cm}^2$

11)  $\frac{9.73 \times 10^3 \text{ km}^2}{1 \text{ km}^2} \cdot \frac{10^3 \text{ m}}{1 \text{ km}} \cdot \frac{10^3 \text{ m}}{1 \text{ km}} = 9.73 \times 10^9 \text{ m}^2$

12)  $\frac{5.264 \times 10^{-6} \text{ km}^2}{1 \text{ km}^2} \cdot \frac{10^3 \text{ m}}{1 \text{ km}} \cdot \frac{10^3 \text{ m}}{1 \text{ km}} = 5.264 \times 10^{-4} \text{ cm}^2$

13)  $\frac{1.672 \times 10^3 \text{ kg}}{1 \text{ cm}^3} \cdot \frac{10^3 \text{ g}}{1 \text{ kg}} \cdot \frac{10^2 \text{ cm}}{1 \text{ m}} \cdot \frac{10^2 \text{ cm}}{1 \text{ m}} = 1.672 \times 10^{12} \text{ g/m}^3$

Name \_\_\_\_\_

**DIMENSIONAL ANALYSIS**

Important conversions: 5280ft = 1 mile, 39.37inches = 1 meter, .625miles = 1km

1. How many seconds in three weeks and four days?

$\frac{3 \text{ weeks}}{1} \cdot \frac{7 \text{ days}}{1 \text{ week}} \cdot \frac{24 \text{ hrs}}{1 \text{ day}} \cdot \frac{60 \text{ min}}{1 \text{ hr}} \cdot \frac{60 \text{ sec}}{1 \text{ min}} = 1,814,400 \text{ sec} + 345,600 \text{ sec} = 2.16 \times 10^6 \text{ sec}$

2. How many decimeters are in .750miles?

$\frac{.750 \text{ mi}}{1} \cdot \frac{1 \text{ km}}{.625 \text{ mi}} \cdot \frac{10^3 \text{ m}}{1 \text{ km}} \cdot \frac{10 \text{ dm}}{1 \text{ m}} = 1.20 \times 10^4 \text{ dm}$

3. How many miles are in 145678 meters?

$\frac{145678 \text{ m}}{1} \cdot \frac{1 \text{ km}}{10^3 \text{ m}} \cdot \frac{.625 \text{ mi}}{1 \text{ km}} = 91.04875 \text{ mi} = 91.0 \text{ mi}$

4. How many weeks are in 342157 seconds?

$\frac{342157 \text{ sec}}{1} \cdot \frac{1 \text{ min}}{60 \text{ sec}} \cdot \frac{1 \text{ hr}}{60 \text{ min}} \cdot \frac{1 \text{ day}}{24 \text{ hr}} \cdot \frac{1 \text{ week}}{7 \text{ days}} = 56573.7804 \text{ weeks} = 56573.7804 \text{ weeks}$

5. Find the volume of a brick which has a density of 2200 g/cm<sup>3</sup> and mass of 10.75kg

$\rho = \frac{m}{V} \Rightarrow 2200 = \frac{10.75 \times 10^3}{V} \Rightarrow V = \frac{10.75 \times 10^3}{2200} = 4.8863636 \text{ cm}^3 = 4.9 \text{ cm}^3$