1. Indicate the number of significant figures in each of the following measurements:
   
   a) 1.30 mL \[ \boxed{3} \]  
   b) 3.51 g \[ \boxed{3} \]  
   c) 10.2146 g \[ \boxed{6} \]  
   d) 0.040 cm \[ \boxed{2} \]  
   e) 3 \times 10^6 m \[ \boxed{1} \]  
   f) 2.2 \times 10^{-2} \text{ cm} \[ \boxed{2} \]  

2. Convert the following measurements to standard scientific notation. Each is shown to the correct number of significant figures.
   
   a) 627.0 mm \[ \boxed{6.270 \times 10^2 \text{mm}} \]  
   b) 0.001 640 g \[ \boxed{1.640 \times 10^{-3} \text{g}} \]  
   c) 1823.10 km \[ \boxed{1.82310 \times 10^3 \text{km}} \]  

3. Complete the following calculations and show each answer to the proper number of significant figures. Include the correct units in your answers.
   
   a) 1.620 L + 17.10 L \[ \boxed{18.72 \text{L}} \]  
   b) 2.71 mL - 2.425 mL \[ \boxed{0.28 \text{mL or 0.29 mL}} \]  
   c) 25.8 L / 2.334 L \[ \boxed{11.0 \text{ or 11.1}} \]  
   d) 67.15 cm \times 12.5 \text{ cm}^2 \[ \boxed{839 \text{ cm}^3} \]  
   e) (1.32 cm)^3 \[ \boxed{2.30 \text{cm}^3} \]  
   f) (11.3 \times 10^2 \text{ cm}) \times (5.4 \times 10^{-3} \text{ cm}) \[ \boxed{6.1 \text{ cm}^2} \]  
   g) (6.1 \times 10^3 \text{ m}) - (5.3 \times 10^4 \text{ m}) \[ \boxed{-4.7 \times 10^4 \text{m}} \]  

4. Round off as indicated.
   
   a) 3.5 g to 1 significant figure \[ \boxed{4 \text{g}} \]  
   b) 4.721 \times 10^3 to the nearest thousand \[ \boxed{5 \times 10^3} \]  
   c) 0.12351 \text{ ml} to 3 significant figures \[ \boxed{0.124 \text{ml}} \]
5. A rectangular piece of zinc foil has a length of 18.4 cm, a width of 15.5 cm and a mass of 0.70 g. The density of zinc is 6.30 g/cm³. **Calculate the thickness of the zinc.** Show all work, and report the answer to the correct number of significant figures, in standard scientific notation.

\[
\begin{align*}
A &= 18.4 \text{ cm} \times 15.5 \text{ cm} = 285.2 \text{ cm}^2 \\
V &= \frac{\text{Mass}}{D} = \frac{0.70 \text{ g}}{6.30 \text{ g/cm}^3} = 0.11 \text{ cm}^3 \\
T &= \frac{V}{A} = \frac{0.11 \text{ cm}^3}{285.2 \text{ cm}^2} = 3.9 \times 10^{-4} \text{ cm}
\end{align*}
\]

6. In an experiment to determine the density of an unknown liquid, 5 people obtained the following results:

<table>
<thead>
<tr>
<th></th>
<th>Volume (mL)</th>
<th>Mass (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.6</td>
<td>3.01</td>
</tr>
<tr>
<td>2.</td>
<td>2.8</td>
<td>5.39</td>
</tr>
<tr>
<td>3.</td>
<td>5.0</td>
<td>9.82</td>
</tr>
<tr>
<td>4.</td>
<td>8.2</td>
<td>14.81</td>
</tr>
<tr>
<td>5.</td>
<td>9.7</td>
<td>18.43</td>
</tr>
</tbody>
</table>

a) Prepare a properly labelled graph of the data on graph paper. Use volume as the independent variable.

b) What is the slope of the graph to 3 significant figures? Show your work! — **See graph!**

\[
\text{Slope} = \frac{11.6}{6.00} = 1.93 \text{ g/mL}
\]

c) What is the equation of the relationship obtained above?

\[
\text{mass} = 1.93 \text{ g/mL} \times \text{volume}
\]

\[
(y = mx + b \text{ so mass} = \text{Slope} \times \text{volume} + y \text{- intercept})
\]

d) What will be the volume of 275.5 g of the liquid? Show your work!

\[
275.5 \text{ g} \div 1.93 \text{ g/mL} = 143 \text{ mL}
\]
Mass of Liquid versus Volume of Liquid

\[ \Delta y = 17.25 - 5.70 = 11.55 \text{ g} \]

\[ \Delta x = 9.00\text{ mL} - 3.00\text{ mL} = 6.00\text{ mL} \]

Slope = \[\frac{\Delta y}{\Delta x} = \frac{11.55\text{ g}}{6.00\text{ mL}} = 1.93\text{ g/mL} \]