1. Write the correct metric equivalents

a. \(1 \text{ ng} = \quad \) g \\
b. \(1 \mu \text{L} = \quad \) L \\
c. \(1 \text{ km} = \quad \) m \\
d. \(1 \text{ GW} = \quad \) W (W = Watt) \\
e. \(1 \text{ MJ} = \quad \) J (J = Joule) \\
f. \(1 \text{ cm} = \quad \) m \\
g. \(1 \text{ s} = \quad \) ns (s = second) \\
h. \(1 \text{ mg} = \quad \) g \\
i. \(1 \text{ L} = \quad \) µL \\
j. \(1 \text{ m} = \quad \) km

2. Convert the following metric units. Show your work. Train yourself to work on paper, not just in your head or on the calculator screen. Make sure your answers make sense!

a. \(15 \text{ mg} \to \text{kg} \quad \) _________ \\
b. \(0.105 \text{ nm} \to \text{mm} \quad \) _________ \\
c. \(0.0095 \mu \text{s} \to \text{s} \quad \) _________ \\
d. \(18 \text{ nm} \to \text{cm} \quad \) _________ \\
e. \(1 \text{ km} \to \text{cm} \quad \) _________ \\
f. \(1 \text{ km} \to \text{mm} \quad \) _________ \\
g. \(0.025 \text{ mL} \to \text{L} \quad \) _________ \\
h. \(4.99 \times 10^{-4} \text{ mm} \to \text{km} \quad \) _________ \\
i. \(55.5 \text{ cm/µsec} \to \text{mm/sec} \quad \) _________ \\
j. \(3.00 \times 10^4 \text{ mg/m}^3 \to \text{g/cm}^3 \quad \) _________

3. Write the rule for treating significant figures in addition problems.

Apply the above rule to the following arithmetic, with correct sig figs in your answer.

a. \(5.698 + 12.3 \quad \) b. \(0.0034 + 0.00989 \quad \) c. \(4.658 - 2.3 \quad \) d. \(87000 + 21.2 \)

a: _________  b: _________  c: _________  d: _________
4. Write the rule for treating significant figures in multiplication problems.

5. Apply the above rule to the following arithmetic, with correct sig figs in your answer.
   a. 5.6981 \times 1334.3  \hspace{1cm} b. 9.00034 \times 0.00989  \hspace{1cm} c. 4.658 \times 2.3  \hspace{1cm} d. 49500.0 \times 21.2
   a: \hspace{1cm} b: \hspace{1cm} c: \hspace{1cm} d: \hspace{1cm}
   e. (31.41 \times 698.0 \times 34.40)/9.0 \times 10^{-2} \hspace{1cm} e: \hspace{1cm}

6. Write the rule for treating significant figures where addition and multiplication operations are conducted in a long sequence.

7. Apply the above rule to the following arithmetic, with correct sig figs in your answer.
   a. (32.13 – 31.95) \times 32.95 = \hspace{1cm}
   b. (0.008998 \times 4.387) + 0.0004297 = \hspace{1cm}
   c. (48.7980 \div (0.034329 + 1.145)) = \hspace{1cm}

8. What is wrong with how the following numbers are written?
   a. 44.59 \times 10^4
   b. 46500 mm

9. Perform the following operations, with correct sig figs, of course. Write the answer in decimal and scientific notation.

<table>
<thead>
<tr>
<th>sci notation</th>
<th>decimal</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. \hspace{1cm}</td>
<td>\hspace{1cm}</td>
</tr>
<tr>
<td>b. \hspace{1cm}</td>
<td>\hspace{1cm}</td>
</tr>
</tbody>
</table>
10. The **exact** unit equivalents of measure in U.S. surveying are below:

7.92 inches = 1 link  
100 links = 1 chain  
10 chains = 1 furlong  
80 chains = 1 mile

a. The Kentucky Derby is a race of 1.250 miles. What is the length of the race in?  (show work)

furlongs  ____________

Inches  ____________

b. A horse runs a race at the speed of 2.92 meters per second. What is this speed in chains/hour

11. Water contains 18.01 g/mole, and the density of water is 0.9975 g/mL 25 °C. How many moles of water are in 1.00 cups, if there are 8 oz/cup, 128 oz in 1 gal, and 3.785 L/gal?  (show work)

12. A sample of gasoline has a density measured to be 0.65 g/mL. How much does 34.58 L of gasoline weigh in: kg, ng, and pounds.  (show work)

kg ______________

ng ______________

pounds __________
13. Calculate the speed of light expressed in the units of city blocks per snap. 1 city block = 528 feet. 1 snap = 0.483 seconds. In a vacuum, the speed of light is $2.998 \times 10^8$ m/s (show work).

14. solve, with correct SF

a. $(1.700 \times 10^4) \times (2.010 \times 10^{-8}) = \text{______________________}$

b. $(7.0 \times 10^{15}) \times (1.08 \times 10^{-3}) = \text{______________________}$

\[ \frac{(2.00 \times 10^{-19})}{(3.899 \times 10^2)(7.1 \times 10^5)} \]

c. $= \text{______________________}$

d. $(1.255 \times 10^{-5}) \times (6.022 \times 10^{23}) = \text{______________________}$

e. $\log_{10} 100 = \text{______________________}$

f. $\log_{10} 0.001 = \text{______________________}$

g. $\log_{10} 4.23 \times 10^{-4} = \text{______________________}$
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on Dr. Baxley's web page

Please complete this form and return to Dr. Baxley with this assignment, stapled to the back.

I, _____________________________ hereby voluntarily grant Dr. Baxley permission to post the grades, scores and percentages earned by me on all assignments, the final examination, and the final course grade on Dr. Baxley's Cuesta web site. I understand that these grades and scores will NOT be posted under my name or SSN but by the following five digit code, where the first character is a letter.

Date  ____________________________

Signature _____________________________

Section ______________________________

Secret code ____________

↑ Must be a letter ↑

Must be unique numbers (not 55555 or 12345 etc)