Significant Figures and Scientific Notation

1. How many significant figures are in each of the following measured values and constants?

   a) 7.42 kg ____ b) 4.6 cm ____ c) 3.40 mg ____ d) 26,900 m ____

   e) 0.0088 mm ____ f) 0.034010 g ____ g) 0.0230 L ____ h) 0.3080 g ____

   i) 6.022×10^{23} atoms ____ j) 450×10^{-9} m ____ k) $6.6260755 \times 10^{-34}$ Js ____

2. Write each of the following numbers in proper scientific notation format:

   a) 423 _____ b) 0.032 _____

   c) 8,300 _____ d) 302.00 _____

   e) 12,400,000 _____ f) 0.000007 _____

   g) 0.0004200 _____ h) 4,800,010 _____

3. Identify the correct number of decimal places (dp's) each answer should have then perform the following addition and subtraction calculations reporting each answer with the correct number of sig fig's.

   a) 17.10 g (____ dp's)
   + 0.77 g
   (____ sig fig's)

   b) 57.826 g (____ dp's)
   - 9.4 g
   (____ sig fig's)

   c) 1001.0 mm (____ dp's)
   + 9824 mm
   (____ sig fig's)

   d) 0.00235 moles (____ dp's)
   - 0.00200 moles
   (____ sig fig's)

   e) 2.75×10^{-2} m (____ dp's)
   + 3.14×10^{-1} m
   (____ sig fig's)

   f) 6.1999×10^{2} cm (____ dp's)
   - 4.299×10^{2} cm
   (____ sig fig's)

4. Identify the correct number of significant figures each answer should have then perform the following multiplication and division calculations reporting each answer with the correct number of sig fig's.

a) 12.4 cm x 1.82 cm =

(____ sig fig's)

b) 6.4 mm x 3.1416 =

(____ sig fig's)

c) $\frac{0.5172g}{0.2742mL} =$

(____ sig fig's)

d) $\frac{0.0172m}{4.36\,\text{sec}} =$

(____ sig fig's)

e) $\frac{5.82g \times 760.cm \times 425cm}{723cm \times 273cm} =$

(____ sig fig's)

f) $\frac{0.92m \times 454m \times 5.620m}{22.4L} =$

(____ sig fig's)

5. Perform the following calculations reporting each answer with the correct number of sig fig's, **in proper scientific notation.**

a) $2.71 \times 10^{4} \times 2.0 \times 10^{4} =$

b) $\frac{4.523 \times 10^{4}}{2.71x10^{2}} =$

c) $4.8 \times 10^{4} \times 3.50 \times 10^{4} =$

d) $\frac{1.64 \times 10^{-4}}{1.2 \times 10^{2}} =$

e) $\frac{4.70 \times 10^{2}}{8.42 \times 10^{5}} =$

Continued….don't forget the units here☺

f)
$$\begin{array}{r} 1.832\ \text{g} \\ 45.20\ \text{g} \\ +\ \underline{37.55\ \text{g}} \end{array}$$

g)
$$\begin{array}{r} 714.3\ \text{g} \\ -\ \underline{28.52\ \text{g}} \end{array}$$

h) $2.83 \times 10^{3}\, m \times 7.55 \times 10^{7}\, m =$

i) $4.4 cm \times 5{,}280 cm =$

j) $\dfrac{7.07 \times 10^{-4}\, g \times 6.51 \times 10^{-2}\, mL}{2.92 \times 10^{4}\, mL} =$

k) $(6.75 \times 10^{-8}\ \text{m}) + (5.43 \times 10^{-7}\ \text{m}) =$

l) (8.52 cm + 4.1586 cm) x (18.73 cm + 153.2 cm) =

m) (8.52 cm x 4.1586 cm) + (18.73 cm x 153.2 cm) =

n) $\sqrt{(8.32 \times 10^{-3}\ \text{km}^2)} =$

o) $(3.84 \times 10^{-2}\ \text{mm})^3 =$

p) $(0.000738\ \text{g} - 8.3 \times 10^{-3}\ \text{g}) / (6.298 \times 10^{-8}\ \text{mL}) =$

Standard Deviation

Calculate the Standard Deviation for the following sets of data collected in a Chemistry 110 lab.
Report the average value and the standard deviation with the correct number of significant figures and units.

Mass of pennies	=	3.0107 grams
(pre-1986)		3.0532 g
		3.0098 g
		3.0463 g
		3.0351 g
		3.0079 g

Volume of solution	=	7.12 milliliters
(10-mL cylinder)		7.24 mL
		6.92 mL
		7.02 mL
		7.09 mL
		6.95 mL

Height of Mercury (Hg)	=	743.6 millimeters of Hg
(barometer)		749.1 mm Hg
		752.8 mm Hg
		741.5 mm Hg
		747.3 mm Hg