SIGNIFICANT FIGURES

All measured quantities have a certain degree of uncertainty associated with the measurement.

SIG.FIGS indicate the amount of uncertainty in a measurement.

SIG.FIGS. are all those digits in a measurement that are known with complete certainty and one digit that is guessed.

15.0 km indicates more precision than 15 km.

Rules For Determining the Number of Significant Figures:

1. All numbers greater than zero are significant.

Number	# Sig Figs
14.2	3
1218	4
2	1

Sig. Figs cont..

2. Zeros between non-zero numbers are significant.

Number	# Sig Figs
101	3
1001	4
1.004	4

Sig. Figs cont..

3. Zeros used to locate decimal places and to the left of non-zero digits are not significant.

Number	# Sig Figs
0.006	1
0.0614	3
0.7	1

Sig. Figs cont..

4. All zeros to the right of a non-zero digit containing a decimal are significant.

Number	# Sig Figs
10.010	5
12.000	5
0.00500	3

Sig. Figs. cont…

5. Zeros to the right of a non-zero digit containing no decimal are not significant.
Ex: 400 contains one significant figure.
If 400 contains 2 or 3 significant figures it can be indicated as follows:

$\overline{40}0$ or 4.0×10^2 for 2 significant figures

$\overline{400}$ or 4.00×10^2 for 3 significant figs

Sig. Figs cont..

6. Exact values such as definate values and counting numbers(1,2,3, etc.) have an infinite number of significant figures.
Ex: 1 L = 1000 mL, the number 1000 has an infinite number of significant figures.

Rounding Significant Figures:

1. If the first unwanted digit is less than five, discard all unwanted digits and leave all wanted digits alone.

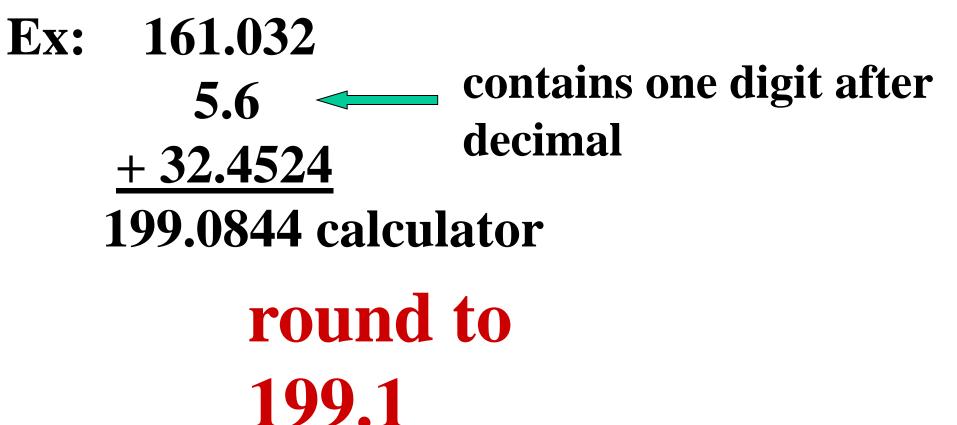Ex: If 3.7247 is rounded to 3 significant figures, the result is

3.72

Rounding Significant Figures cont.:

2. If the first unwanted digit is greater than five, discard all unwanted digits and increase the last wanted figure by one.

Ex: If 8.56473 is rounded to 4 significant figures, the result is

8.565

Calculations Using Significant Figures:

- ## Addition/Subtraction:

- **The result of the calculation must be rounded off to the same number of decimal places as the term used in the problem with the least number of decimal places.**

Ex: 161.032

     5.6 ← **contains one digit after decimal**

+ 32.4524

199.0844 **calculator**

round to

199.1

Calculations Using Significant Figures cont..:

- **Multiplication/Division:**

- **The result of the calculation must contain the same number of significant figures as the term used in the calculation with the least number of significant figures.**

Ex: 152.06 ⇐ **contains 5 significant**

    ×**0.24** ⇐ **contains 2 significant**

36.4944

must be rounded to 36

SIG.FIGS. and Scientific Notation:

The number of SIG.FIGS. only expressed in the pre exponential term.

Sci Notation	# SIG.FIGS.
1×10^9	1
1.0×10^6	2
1.650×10^{-8}	4