Significant Figures

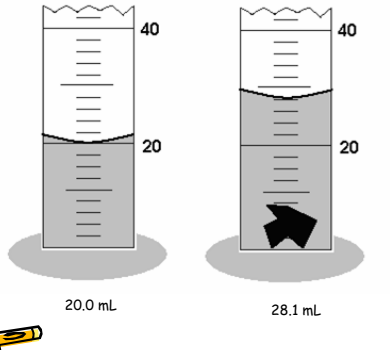
Rules to determine which numbers are significant

1. All non-zero numbers are significant
   123,456 has _____ sig figs
2. Zeroes between non-zero digits are significant
   2008 has _____ sig figs
   50000000001 has _____ sig figs

3. Zeroes to the left of the first non-zero number are not significant…they are only placeholders
   0.00000485 has _____ sig figs
4. Any zeroes at the end of a number that contains a decimal point ARE significant (trailing zeroes)
   900.00 has 5 sig figs

5. Zeroes at the end of a whole number that does not contain a decimal point are NOT significant
   8000 has _____ sig figs
   8000. has _____ sig figs
6. When numbers are in scientific notation, disregard the power of ten and use rules 1-5 on the decimal number only.
   2.05 x has ___ sig figs

- The number of decimal places in a measurement depends on the piece of equipment used
- Researchers report all digits they are certain of plus one unit they are uncertain of (estimated number)



Rules for Addition and Subtraction

- Your calculated value will have the same number of sig figs to the right of the decimal point as that of the least precise quantity

Try these…

1. 17.898 – 15.2 = 2.7
2. 32 + 19.4 = 51

Rules for Multiplication and Division

- The number of sig figs in the final calculated value will be the same as that of the quantity with the <u>fewest number</u> of sig figs

Try these…

1. 111 ÷ 5 = 22.2 → 20
2. 12.57 x 3.2 = 40.
3. 2.2 x 4.59 x 12.39 = 125 → 130

Combined Problems

First apply addition/subtraction rules and then apply multiplication/division

$$\frac{(4.32 + 5.0) \times 768}{9.3} = \frac{7142}{9.3} \rightarrow 7100$$

Precision vs. Accuracy

- <u>Precision</u>: reproducibility or repeatibility
- <u>Accuracy</u>: degree of closeness to an accepted value