Math 1030 #7c

Dealing With Uncertainty

Accuracy vs. Precision

relative, absolute

random, systematic

significant digits

accuracy, precsion

<u>Accuracy</u> - how closely a measurement approximates a true value.

<u>Precision</u> - describes the amount of detail in a measurement.

EX 1: Suppose your true weight is 120.7 lb. The scale at the
   doctor's office measures your weight as 121.72 lb. The
   scale at the gym measures your weight as 120.4 lb.

   a) Which scale is more precise?

   doctor's office (it's precise to the hundredth's place)

   b) Which is more accurate?

   120.4 is closer to 120.7 than 121.72 is.
   ⇒ scale at gym is more accurate

EX 2: Suppose your actual height is 5 feet and 5.2 inches. A tape
   measure which can be read to the nearest 1/8 of an inch gives
   your height as 65 3/8 inches. The laser device at the clinic that
   gives readings to the nearest hundredth of an inch says you are
   65.31 inches.

   actual ht : 65.2 in   tape: 65.375 in
                             laser: 65.31 in
   a) Which is more precise?

   tape measure is precise to the thousandth's place

   b) Which is more accurate?

   65.31 is close to actual ht of 65.2 in
        in
   ⇒ laser is more accurate

<u>Rules for Combining Measured Numbers</u>

Add/Subtract: round your answer to the same precision as the least precise number in the problem.

Multiply/Divide: round your answer to the same number of significant digits as the measurement with the fewest significant digits.

EX 3: Use the rounding rules to calculate these answers.

a) At the deli, you purchase .25 lb. of coleslaw and 1.3 lb. of turkey. What is the total weight of your purchase?

(adding)

$$0.25 + 1.3 = 1.55 \text{ lbs}$$

(least precise # is precise to tenths place)

final answer: 1.6 lbs

b) You traveled 30 miles in 0.85 hours, what was your average speed?

(dividing)

$$\text{avg speed} = \frac{30 \text{ mi}}{0.85 \text{ hrs}} \approx 35.2941 \text{ mi/hr}$$

(round to 1 sig. digit)

$$\approx 40 \text{ mi/hr}$$