Name: _____ Block: _____

Error Analysis

1. A pitching machine pitched five baseballs a distance of 18.44 m in the following times: 0.52 s, 0.50 s, 0.54 s, 0.57 s, and 0.51 s.

   (a) What was the average time it took for the five baseballs to get from the pitching machine to home plate?

0.528 s

   (b) What is the uncertainty in the time it took for the baseballs to travel from the pitching machine to home plate? (Assume a 95% confidence level.)

±0.04 s

2. A group of physics students measured one student's height with a 30 cm ruler and found the student to be 172 cm tall. The uncertainty of each measurement with the 30 cm ruler was ±0.1 cm. What was the uncertainty of the measurement of the student's height? (*Hint: You will need to figure out how many times the 30 cm ruler was used to measure the 172 cm.*)

±0.6 cm

3. You are driving your friend home from school. First, you drive 3.4 miles to your friend's house (going past your house on the way). Then you drive 1.2 miles back to your house. If the uncertainty in your car's odometer reading is 0.1 mile, how far is it from school directly to your house (including the uncertainty)?

2.2 mi. ± 0.2 mi.

4. The square floor tiles in Mr. Bigler's classroom are (0.305 ± 0.001) m on each side. If the room is 30 tiles side to side and 32 tiles front to back, what is the total area of the floor (including the uncertainty)?

$\boxed{(89.3 \pm 0.6)\ \text{m}^2}$

5. You drive West on the Mass Pike, from Route 128 to the New York state border, a distance of 127 miles. The EZ Pass transponder determines that your car took 1 hour and 54 minutes to complete the trip, which is an average speed of 66.8 $\frac{\text{mi.}}{\text{hr.}}$. If the uncertainty in the distance is ± 1 mile and the uncertainty in the time is ± 5 seconds, can you fight the ticket and win? (You can win if you prove that with the uncertainty, your speed could be less than 65 $\frac{\text{mi.}}{\text{hr.}}$.

$\boxed{\text{speed} = 66.8\ \frac{\text{mi.}}{\text{hr.}} \pm 0.575\ \frac{\text{mi.}}{\text{hr.}}}$