Lab Homework

This homework will count as one lab grade. It should be turned in at the beginning of the Motion Graphs lab.

1) Follow Appendix B to analyze the following data. Answer questions a), b), c), d), and e) from Appendix B for this data set. Assume the true value of L is 93.40 cm.

L (cm)	93.2	93.3	93.9	92.8	93.5	93.4	92.9

2) Suppose you have a second set of data for the same quantity that gives the following result:
$L = (93.90 \pm 0.02)$ cm.

    a) Is this result more or less precise than the one in question 1d? Defend your answer.
    b) Is this result more or less accurate than the one in question 1d? Defend your answer.
    c) Do the two results agree? Defend your answer.
    d) What is the relative discrepancy between the two results?

3) Use the rules in part f) of Appendix B to combine the following numbers:
$L_1 = 5.02 \pm 0.03$ m, $L_2 = 8.44 \pm 0.06$ m, $t = 10.20 \pm 0.04$ s.

    a) Find the uncertainty of $L_1 + L_2$ and report the value of $L_1 + L_2$.
    b) Find the uncertainty of $L_1 \times L_2$ and report the value of $L_1 \times L_2$.
    c) Find the uncertainty of L_1/t and report the value of L_1/t.
    d) Find the uncertainty of L_1^2 and report the value of L_1^2.

4) In question 3a above, which value, L_1 or L_2, introduces the greater uncertainty to the value of $L_1 + L_2$? Defend your answer.

5) In question 3c above, which value, L_1 or t, introduces the greater uncertainty to the value of L_1/t? Defend your answer.

6) Follow Appendix A to make a graph of the following data. Add the best fitting straight line to your graph (the regression line). Enable point protectors and turn off the 'connect points' option.

t(s)	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50
v(m/s)	3.4	5.2	7.3	9.9	12.1	14.3	16.1	18.4	20.5

7) Does the data agree with the regression line? Defend your answer.

8) Report the values of slope and y-intercept of the line, including their uncertainties.