1) Taylor P8.4, page 200.

2) Taylor P8.10, page 201. Just do the first part of the problem (weighted LSQ estimate of A and B). Skip everything after “Compare……”

3) Suppose our variables x and y are related by:
   \[ y = \alpha x + \beta x^3 \]
   Assume we have n measurement pairs: \((x_i, y_i \pm \sigma)\) (all y’s have the same uncertainty, \(\sigma\)). Use the method of Least Squares to derive formulas for the best estimate of \(\alpha\) and \(\beta\).

4) Use the WEB, the SEL Library, notes, whatever, to answer the following questions (in one or two sentences):
   a) What is the difference between two variables that are uncorrelated and two variables that are independent?
   b) What is a “student’s t-distribution” and when is it used?
   c) What is a “Kolmogorov Test” and when is it used?
   d) What is a “Run Test” and when is it used?

5) Suppose the size of nanotubes is given by a Gaussian distribution with mean = 6 nm and standard deviation = 1 nm.
   a) What is the 90% Confidence Interval (symmetric) for the size of these nanotubes?
   b) What is the confidence level for measuring a nanotube with size \(\geq 8\) nm?