1. Consider the following data set:

x	1	3	5	8
y	2	3	6	7

A proposed model for these data is given by the equation

$$y = 0.75x + 1.25.$$

Find the error, e_i, between the y values of each of the points and proposed model. Give the sum of the squares of the errors. Sketch a graph of the data points and the line.

2. A limited set of data is collected and shown in the table below:

t	1	3	5	8
y	4	3	6	5

Two researchers interpreted these data differently. Researcher A felt that a good model is given by

$$y = 0.4x + 2.6,$$

while Researcher B thought the biological evidence suggests a better model, which satisfies the equation

$$y = -0.4x + 6.2.$$

a. Sketch the graph of the data points and the two lines. Which model shows an increasing relationship between the variables and which one shows a decreasing relationship?

b. Find the sum of the squares of the errors for each of the models. Which one is better according to the data?

c. Use the formula in the appendix to find the least squares best fit line for the data in this problem. Which researcher had the right understanding of how y related to x?

3. A research project on the plankton examines the light intensity filtered by the plankton as a function of the depth of the water. The data are shown in the table below:

depth (m)	1	1.5	2	3	4	5
intensity	0.32	0.29	0.27	0.27	0.15	0.11

a. The least squares best fit to this data set is given by the equation

$$I = -0.0524d + 0.3792,$$

where d is the depth in meters and I is the intensity of light filtered by the plankton. Find the sum of squares error. Graph the data and the least squares best fit line.

b. On observing the graph of the data, one point seemed obviously erroneous. Which point is most likely erroneous? When this point is removed, then the new least squares best fit model is given by

$$I = -0.0536d + 0.3728.$$

Find the sum of squares error for this model. If the model in Part b. is taken to be the actual model, then find the percent error between the slopes of the models in Parts a. and b.