Chapter 10: In Class Exercises

1. A research study has been conducted to determine the loss of activity of a drug. The table below shows the results of the experiment.

Time (in years)	1	2	3	4	5
Activity (%)	96	84	70	58	52

   a) Construct the linear regression model of activity on time.

   b) According to the linear model, when will the activity be 80%? When will the drug have lost all activity?

2. You wish to examine the relationship between the square footage of produce stores and its annual sales. Sample data for 4 stores were obtained.

Store	Square Feet	Annual Sales (in thousands $)
1	1726	3681
2	1542	3395
3	2816	6653
4	5556	9543

Let x be square feet and y be annual sales. Some pre-computed values for regression analysis obtained from these data are:

$\bar{x} = 2910, \quad \bar{y} = 5818,$

$$SS_{xy} = \sum_{i=1}^{4}(x_i - \bar{x})(y_i - \bar{y}) = 15,622,732$$

$$SS_{xx} = \sum_{i=1}^{4}(x_i - \bar{x})^2 = 10,283,432$$

$$SS_{yy} = \sum_{i=1}^{4}(y_i - \bar{y})^2 = 25,010,548.$$

a) Find the simple linear regression line.

b) Find sum of squared errors (SSE), its variance (s^2) and standard deviation (s).

3. (a) Complete the following partial ANOVA table from a simple linear regression analysis with a sample size of 16 observations.

Source	SS	df	MS	F
Regression (b_1)			309.9	
Residual				
Total	995.95			

(b) Use the F-test to test the significance of the model (slope) at $\alpha = 0.05$.