**Linear Regression with Applications**

The following work is expressing my take on the following examples for each specific section regarding the topic covered. This is my understanding of what I have understood from reading the chapter and previous knowledge by writing a paragraph showing how to perform and resolve each example.

7.1 For this problem they gave us a data set. They want us to solve part a-c. Part a. they want us to construct a scatter diagram for the data we could use a software application or by pencil and drawing the x and y axis and plotting the point. For part b. they want use to find the least squares prediction equation. The easy way is by doing a table where we are solve for x,y,x^2,x\*y,y^2 then we would sum each column, having the data we would solve for SSxy = Σxy - (Σx)( Σy)/n and also SSxx = Σx2 - (Σx)2/n then we can find the slope by Slope, β1 = SSxy/SSxx and then we would finalize by finding the y intercept of the data we acquired by ybar - β1\* xbar and we would get y=b0+b1(x) For part c. they want us to graph the least squares line on the scatter diagram and visually confirm that it provides a good fit to the data point by considering this is a good fit because lines crosses the data in a certain spot.

7.2 This problem they gave us data on problem 7.2 they want us to calculate SSE and calculate S^2 and s. To get SSE we have to use the formula SSE = SSyy - β1\* SSxy so in order to do this the only missing data is SSyy we get that by Σy2 - (Σy) 2/n. To get s^2 we have to use the data we acquire and use the function s^2 = SSE/ (n - 2) and to get S we use the function S = √S^2 and we have solve the problem.

7.3 This problem they gave use the data we had for problem 7.1 and 7.2. For part a. they want us to test the null hypothesis that the slope B1 of the line equals 0 against the alternative hypothesis that B1 is not equal to 0 using a level of significance. First thing we have to do is to label everything by. Ho: = 0 Ha: ≠ 0. Then we have to find the degree of freedom by using n-2 we would find the critical value in the table to determine where are we going to reject the null. Then we have to find the tstat by using the function t = β1/(s/√SSxx) then if the value fall in the rejection zone we would reject the null. For part they want us to compute the approximate observed significance level of the test we do this by finding P. For part c. they want us to find the confidence interval of the slope, we have to use the function β1 + tα/2 (s/√SSxx) and we would get our upper and lower values.

7.4 This problem they want us to give an example of two economic or business variable that are a. positively correlated b. negative correlated. For a. we can say the hotter it is the more sale for ice cream there is. For part b. sale are negatively correlated with cost of goods sold

7.5 For this problem they want use to use the values from 7.1-7.3. They want us to calculate the coefficient of determination r^2 and interpret its value already having all the data we only need the formula r2 = (SSyy - SSE)/ SSyy we can say that the data we would get the total sum of square of deviations reference to the sample size and their values about the mean.

7.6 This problem they want to use the data from 7.1-7.3 and they also gave a table. For part a. they want us to estimate the mean of y when x= a number using a confidence interval, and interpret the interval. To solve this we would use the formula yhat + (tα/2) s√ (1/n + (x - xbar) 2/SSxx), and we would get an upper and a lower value with the confidence interval they gave us. For part b. suppose we plan to observe the value of y for a particular experiment unit with x= s number and a prediction interval for a value of y that we will observe, also interpret the interval. WE have to use the formula yhat + (tα/2) s√ (1 + 1/n + (x - xbar) 2/SSxx) to get the interval and then we have to see if x value is within the interval. For par c. which of the two interval constructed in part a. and b. is wider? We do this by checking each answer depending on the scenario will be different but for this problem the prediction interval would be wider than the confidence interval that we solved in part a.