

Second Exam

Write all answers in your blue book and show all work there. Return your exam and printout(s) in your blue book.

30 pts.

1) Consider the data below. Do this work by hand and show your work.

| C | D |
|---|---|
| 7 | 4 |
| 9 | 3 |
| 3 | 1 |
| 2 | 1 |

- Fit a regression line where C is a function of D.
- Find the r^2 for your line and interpret it.
- Find the standard error of the estimate and interpret it.
- Find the standard error of the slope and use it to test for a significant effect of the independent variable. Show all steps to the test ($\alpha = .05$).
- Construct a prediction interval for $\mu_{C,D}$ given $\alpha = .05$ and $D = 3$.

15 pts.

- Suppose that you have a set of data where $\sum X_1 Y = 14$, $\sum Y = 5$, $\sum X_1 = 8$, $\sum X_1^2 = 20$, $\sum X_2 Y = 140$, $\sum X_2 = 44$, $\sum X_2^2 = 200$, $\sum X_1 X_2 = 100$ and $n = 4$. Find the least squares fit via the normal equations. Show your work.
- Sketch a well-labeled diagram of the regression plane that you found.

20 pts.

- Open the football file in the Chapter 16 folder. **Computer Problem**
- Run a regression where the number of wins is a function of all the other variables. Ask for collinearity diagnostics if you can.
- Assess the quality of the results, paying particular attention to the R^2 , the t stats and presence of collinearity.
- Run the regression again with two of the original variables out. Base your choice

on what you saw in part c. In what way is the model better now? In what way is it worse?

15 pts.

4) Consider the data below. **Computer Problem**

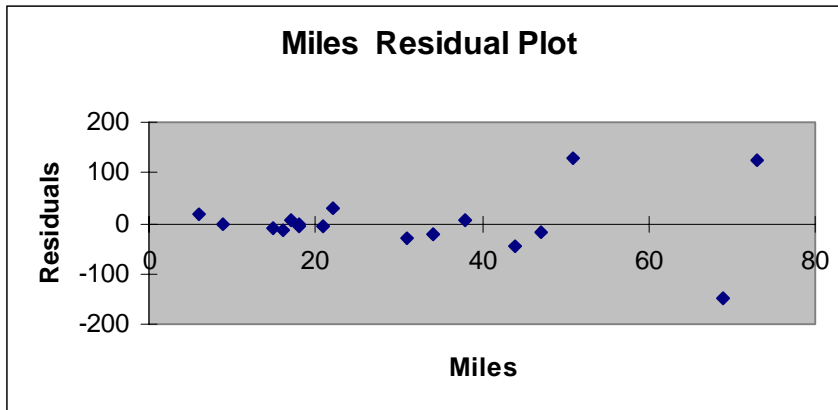
| Q | TC |
|---|-----|
| 3 | 12 |
| 4 | 13 |
| 5 | 20 |
| 6 | 34 |
| 7 | 54 |
| 8 | 84 |
| 9 | 124 |

a) Enter the data into a spreadsheet and find a regression function that you think fits the data best.

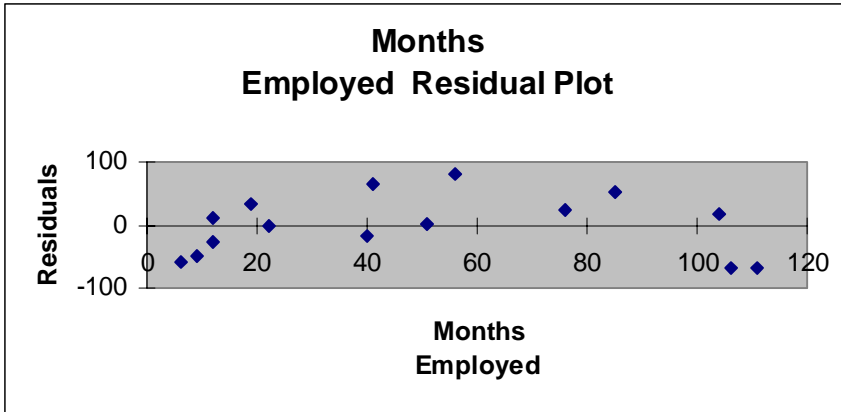
b) Compare your function to a simple linear one. Use the F stat and the adjusted R^2 .

20 pts

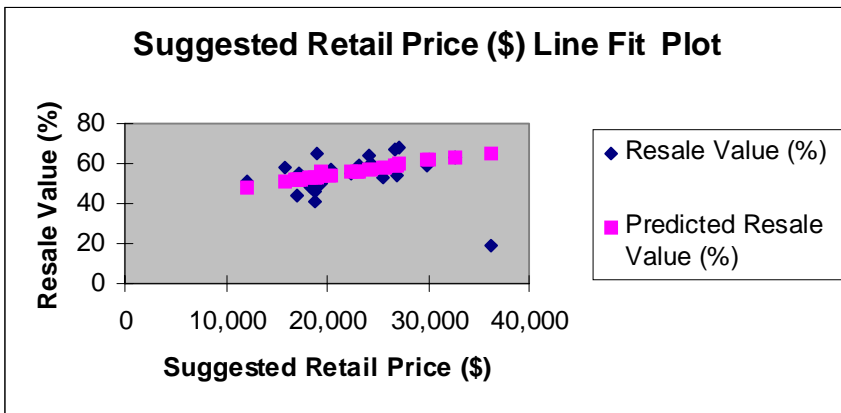
5) Consider the diagrams below.



#1



#2



#3

- In which of the charts (1st, 2nd and/or 3rd), if any, does there appear to be a specification error? Why?
- In which of the charts (1st, 2nd and/or 3rd), if any, does there appear to be heteroscedasticity? Why?
- In which of the charts (1st, 2nd and/or 3rd), if any, does there appear to be an influential observation? Why? If you had the full computer results for the regression what would you check to see if it were influential?

I have neither given nor received unfair aid on this test nor am I aware of anyone else who has.
