Problem 1: # 18 NBA (p. 174)

(a) Construct a matrix scatterplot of WINS (as the response variable), field goals made (FGM), three-point field goals attempted (TFGA), three-point field goals made (TFGM), and the offensive rebounds (OFFREB). Calculate the matrix of correlations among these variables. Do you see a potential problem with multicollinearity? Why or why not?

(b) Fit a multiple linear regression of wins (WINS) on field goals made (FGM), three-point field goals attempted (TFGA), three-point field goals made (TFGM), and the offensive rebounds (OFFREB). Discuss whether there is potentially serious multicollinearity problem with this model. You have to show your evidence.

(c) If there is a multicollinearity problem, discuss how you would remedy the problem. You have to show all the relevant outputs.

Problem 2: A computer repair service is examining the time taken on service calls to repair computers. Data are obtained for 30 service calls. The data are in a file named COMPREP5. Information obtained includes:

x_1: Number of machines to be repaired (NUMBER)
x_2: years of experience of service person (EXPER)
y: time taken (in minutes) to provide service (TIME)

a) Develop a polynomial regression model to predict average time on the service calls using EXPER and NUMBER as explanatory variables. Justify your model choice including transformations of any variables.

b) The company signed a new deal with a client. The client has 10 computers to be repaired every day and the company assign Joe with 5 years of experience to the task. Provide 99% confidence interval on how much time Joe will spend with this client.

c) A walk-in customer dropped to 3 computers to repair. Repairs assigned to Anna with 4 years of experience. Provide the walking customer a 95% confidence interval on when the computers will be ready.

Problem 3: The file named CRIMSPN5 contains the following data for each of the 50 states:
total expenditures on a state's criminal justice system (in millions of dollars) (EXPEND)
total number of police employed in the state (POLICE)

State governments must try to project spending in many areas. Expenditure on the criminal justice system is one area of continually rising cost. Your job is to build a model that can be used to forecast spending on a state's criminal justice system.

a) Does the data need transformation?

b) Develop a multiple regression model.

c) Once your model is complete, predict expenditures for a state that plans to hire 10,000 police personnel. Find a point prediction and a 95% prediction interval.