Show all of your work - I realize some of the answers are in the back of the book so provide your answer in your own words. Please staple in the upper left hand corner.

1. Chapter 3 Exercises
   (a) Question 4
   (b) Question 11
   (c) Question 21
2. Chapter 4 Exercises
   (a) Question 1
   (b) Question 3 (a-e)
3. Consider the data set entitled Anscombe. Consider the pair of variables x1 and y1 to be data set 1, the pair of variables x2 and y2 to be data set 2, and so on. The data is given to you in both 'wide' and 'long' formats - choose whichever makes the particular task easiest.
   (a) Make a side-by-side boxplot that includes x1, x2, x3, x4
   (b) Make a side-by-side boxplot that includes y1, y2, y3, y4
   (c) Calculate the mean and standard deviation for all of the columns. What do you notice?
   (d) Make scatterplots for each set of data.
   (e) For each set of data report the fitted regression line and correlation between the two variables. What are the similarities and differences in the fits?
   (f) Write a sentence on why exploring your data graphically is important especially when reporting numeric summaries.
4. Use the 'Tips' data for this problem.
   (a) What is the correlation between tip and total bill? What is the correlation between total bill and tip?
   (b) What is the correlation between tip+5 and total bill?
   (c) What is the correlation between tip*100 and total bill?
   (d) Create a column for $StdTip = \frac{Tip - \text{mean}(Tip)}{SD(Tip)}$ and one for $StdBill = \frac{Bill - \text{mean}(Bill)}{SD(Bill)}$. How does the estimated slope for predicting StdTip based on StdBill compare to the correlation coefficient between Tip and Bill?
   (e) What is the equation for the fitted regression line for predicting tip based on total bill?
   (f) What is the equation for the fitted regression line for predicting total bill based on tip?
   (g) Using the regression you fit in the previous problem back-solve the prediction equation so that it is of the form: tip = a + b*(total bill). Do you end up with the same equation as in part (d)? If not explain why they are not the same.