Chapter 3 Homework Answers

There aren't any pictures of scatterplots here, but hopefully, the written descriptions and conclusions here can help reassure that the work you are doing is "on-track" (or in the same ball park) -Fr. C

Section 3.1

3.8 (p. 116-7)
a. Speed is the explanatory variable.
b. the relationship is curved. Since the low mileage is actually "good", it makes sense that moderate speeds have the best results (60km/hr)
c. Above average values are at the extreemes (low and high speed)
d. Strong relationship, very little scatter around the curve. the easiest way to predict it to use the scatterplot itself to predict the intermediate values. The function to fit the data is bit too complex to do my hand (or calculator)...

3.9 (p. 120)
Body mass is the explanitory variable, positive, linear, and moderately strong association. The males plot is similar, but with more scatter. The males tend to be larger in general.

3.11 (p. 123)

a. lowest: 107 cla. (with 145 mg sodium)
highest: about 195 cal., with 510 mg sodium.
b. Appears to be good positive association, high cal. hot dogs tend to be high in salt, and low cal tend to be low sodium
c. The lower left point is an outlier. ignoring this poiint, the remaining points seem to fall roughly on a line. (moderately strong)

3.14 (p. 125-6)
1973 seems to fit the trend, but 1975 and 1976 show dramatic drops. Dramatic drops could be from manditory caution flags, etc.

Section 3.2

3.25 (p. 135)
Same scatterplot at 3.9 Both corr. should be positive, but since the men's data is more spread out, it has a smaller corr.
b. Women: r=0.87645
Men r=0.59207
c. Women's x-bar:43.03
Men x-bar: 53.10 The difference in means has no effect in corr.
d. There would be no change, since standardized mesaurements are dimensionless

3.27 (p. 136)
c. corr of original os r=0.2353, as is the transformed data
For the original set, x values range from -4 to+4, a spread of 8 units, while the spread in the y direction is only 1.1 units. For the second data set the horizontal spread is small, compared to the virtical spread of 11 units. What matters in computing the correlation is not the actual sizes, but rather the reletive sizes of these spreads, which is nore difficult to see unless you make two separate plots, each with appropriate x and y scales.

3.28 (p. 136)
The author of the article interpreted a corr. close to 0 as if it weere a correlation close to -1. Actually, there is practiaclly NO association, rather than an inverse association.
3.30 (p. 136)
a. Sex is a categorical varible
b. $-1 < r < +1$
c. r should have no units, since it is standardized (each score is compared to the mean and std. dev. of the data set)

Section 3.3

3.32 (p. 142)
a variety of responses possible here

3.34 (p. 143)
b. the slope is close to 1, meaning that the strength after 28 days is about +1389 psi. So we we expect the extra trhee weks to add about 1400 psi of strength to the concrete
c. 4557 psi.

3.39 (p. 159)
b. The line is clearly not a good predictor of the actual data (too high in the middle and too low on each end
c. The sum is -0.01, a reasonable discrepancy allowing for round-off error.
d. A Straight line is not he appropriate model (see my comments for 3.8)

3.44 (p. 161)
Approx. 650 km/sec. Since there is quite a bit od variation around the line, and r^2 = 0.615, you shouldn't place too much faith in the accuracy of this estimate.

3.45 (p. 161)
b. y-hat = 71.950 + 0.38333x
c. When x=40, y-hat = 87.2832
x=60, y-hat = 94.9498
d. Sarah is growing at about 0.38 cm/month; she should be growing at about 0.5 cm each month (.5=6/(60-48))

3.51 (p. 166)
r= -0.983
y-hat = 950 - 0.364x (x is the year)

Unusual observations are 1868,1884

The regression line seems to be an excellent model for the data. (strong negative association. There are no "influential" observations, since the outliers don't seem to effect the least square regression line. About one third of second is knocked off each year. The estimate for 2000

should be a safe bet, but a bit too much extrapolation to make an estimate for 2005.

3.52 (p. 168-170)

a. 6
b. 2
c. 5
d. 8
e. 3
f. 7
g. 4
h. 1