Ch 9-10 Prior Free Response AP Stats Name _____

Ch 10

1. Drying times y (in minutes) are tabulated for various concentrations of pigment x (in ounces per gallon) for a certain brand of latex paint.

A linear regression model gives y = -5.1x + 59.7 with the following residual plot:



A nonlinear model gives y = -16.8(Lnx) + 59.8 with the following residual plot:



a) What does each model predict for the drying time when using 5 ounces of pigment per gallon?

b) Which model is a better fit? Explain.

Non linear because No pattern in the residuals.
Also has low Se because magnitude of residuals
$$(\pm .3/59.8)$$
 is small.

2. The following scatterplot shows the grades for research papers for a sociology class plotted against the lengths of the papers (in pages).



Mary turned in her paper late and was told by the professor that her grade would have been higher if she had turned it in on time. A computer printout fitting a straight line to the data (not including Mary's score) by the method of least squares gives

Grade = 46.51 + 1.106(Length)

- R-sq = 74.6%
- a) Calculate and explain the correlation coefficient for the relationship between grade and length of paper based on these data (excluding Mary's paper).

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f) Predict what grade she would have received had her paper been on time.

3. The following scatterplot shows the advertised prices (in thousands of dollars) plotted against ages (in years) for a random sample of Plymouth Voyager Mini-Vans on several dealers' lots.



A computer printout showing the results of fitting a straight line to the data by the method of least squares gives

 $\widehat{Price} = 12.17 - 0.997(Age)$ R-sq = 80.0%

a) Find and interpret the correlation coefficient for the relationship between price and age of Voyagers based on these data.

c) Is the equation Price = 12.17 - 0.997(Age) the best fit equation for this data? Explain. This linear eq. is not best fit. The data looks like exponential decay.

d) Over what time frame is a linear model a "good" model? $Q = 2 \gamma \gamma$ Now calculate the best fit line for the sub-set of data which is a smaller time frame. Clearly show your method using algebra. (just plugging into calculator and saying I did LinReg is not sufficient).

4. Data show a trend in winning long jump distances for an international competition over the years 1972-92. With jumps recorded in inches and dates in years since 1900, a least squares regression line is fit to the data. The computer output and a graph of the residuals are as follows:



5. The following scatterplot shows the pulse rate increase (in beats per minute) plotted against the amount of medication (in grams) of an experimental drug being field-tested in several hospitals.



A minitab program was run that gave the least squares regression line of PulseRate = -1.68 + 8.5(Grams) and R-sq = 81.9%

a) Find the correlation coeff. for the relationship between pulse rate increase and grams of medication. Interpret.

d) A patient given 5 grams of medication has zero increase in pulse rate. Does this invalidate the regression equation? Explain.

e) How will the correlation coefficient change if the 3-gram result is removed from the data set? Explain. If the 3gm point is removed, the correlation will increase

 f) Predict the magnitude of the slope of the least squares regression line change if the 3-gram result is removed from the data set? Explain.