Investigation 11: Gestation and longevity? (assigned on Wed Feb 22, due on Tues Feb 28)
You may work with in a group of as many as three students on this assignment, handing in one report with all names, provided that you all contribute to the work. You must submit a word-processed report, with computer output integrated into your report as appropriate.

The data in the Minitab worksheet mammals.mtw report the average gestation period (in days) and the average longevity (in years) for a variety of mammals.

a) Use Minitab to determine the regression equation for predicting gestation period from longevity. Plot this line on a scatterplot (and submit the graph). Report the regression equation and the value of $r^2$. Comment on how well the line seems to describe the relationship between the variables.

b) Look at (and submit) residual plots to investigate whether the assumptions of the regression model are satisfied here. Comment on your findings.

c) Take the logarithm (base 10) of each variable, and examine a scatterplot of log(gestation) vs. log(longevity). Does the relationship appear to be roughly linear?

d) Determine the regression equation for predicting log(gestation) from log(longevity). Also report the value of $r^2$. Then conduct a residual analysis, and comment on your findings.

e) Use this model to predict (with a single value) the gestation period for a different species of mammal, whose longevity is 12 years. [Hint: First find this prediction for log(gestation), then “back-transform” to find the pint estimate for gestation.]

f) Use this model to produce a 95% prediction interval for the gestation period for a species of mammal whose longevity is 12 years. [Hint: First determine a prediction interval for log(gestation) and then “back-transform” to find the prediction interval for gestation.]

g) Use this model to predict (both with a single value and with a 95% prediction interval) the gestation period for the human species of mammal, whose longevity is about 75 years. Is your prediction reasonable? Explain.