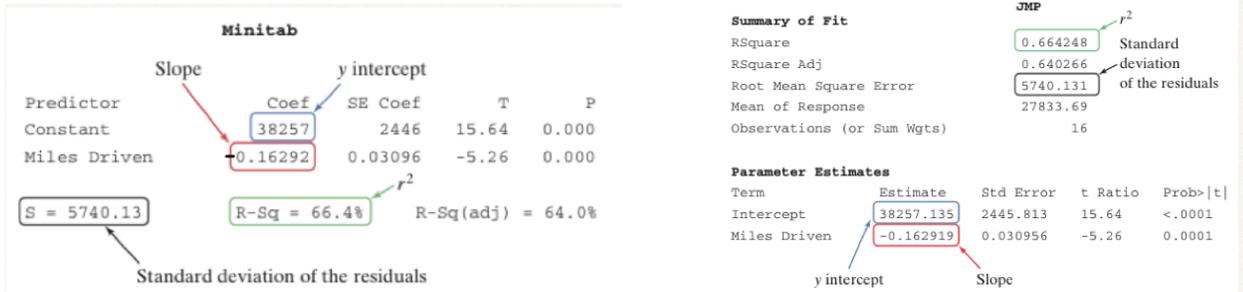
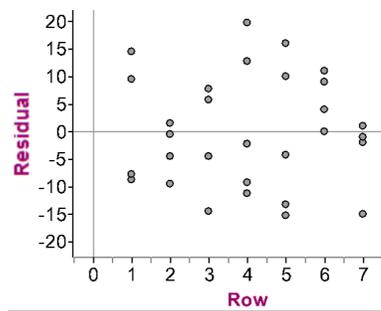
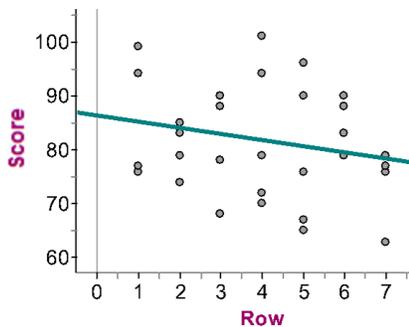


Sample Computer Output for the Ford F150 analysis



1) Does seat location affect grades?

Many people believe that students learn better if they sit closer to the front of the classroom. Does sitting closer *cause* higher achievement, or do better students simply choose to sit in the front? To investigate, an AP®Statistics teacher randomly assigned students to seat locations in his classroom for a particular chapter. At the end of the chapter, he recorded the row number (row 1 is closest to the front) and test score for each student. Least-squares regression was performed on the data. A scatterplot with the regression line added, a residual plot, and some computer output from the regression are shown below.



Predictor	Coef	SE Coef	T	P
Constant	85.706	4.239	20.22	0.000
Row	-1.1171	0.9472	-1.18	0.248

S = 10.0673      R-Sq = 4.7%      R-Sq(adj) = 1.3%

**Questions:**

- What is the equation of the least-squares regression line that describes the relationship between row number and test score? Define any variables that you use.
- Interpret the slope of the regression line in context.
- Find the correlation.
- Describe what the Coefficient of Determination tells you (in plain English).
- What does  $s = 10.0673$  tell us?
- Is a line an appropriate model to use for these data? Explain how you know.
- The mean and standard deviation of the row numbers are  $\bar{x} = 4.033$  and  $s_x = 1.974$ . Determine  $\bar{y}$  and  $s_y$  from the given information.

- 2) The computer output below shows the result of a linear regression analysis for predicting the concentration of zinc, in parts per million (ppm), from the concentration of lead, in ppm, found in fish from a certain river.

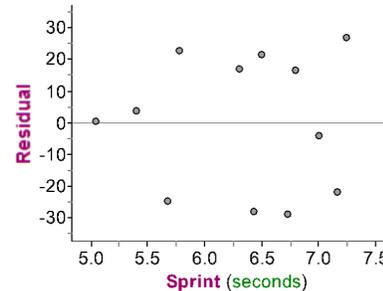
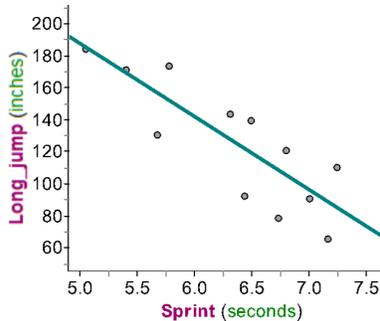
Response variable is Zinc (ppm)				
Variable	Coefficient	Std Dev	T	P
Constant	16.3	4.90	3.32	0.003
Lead (ppm)	19.0	1.89	10.01	0.000

S = 16.17    R-Sq = 82.0%

**Questions:**

- What is the equation of the least-squares regression line that describes the relationship between lead and zinc levels? Define any variables that you use.
- Interpret the slope of the regression line in context.
- Find the correlation.
- Describe what the Coefficient of Determination tells you (in plain English).
- What is the predicted zinc level in a fish with a lead level of 17.5 ppm?
- If scientists had treated Zinc as the explanatory variable and Lead as the response variable, what would their LSRL equation have been?
- If possible, determine the correlation value for the relationship described in part (f).

- 3) In Section 3.1, we looked at the relationship between the 40-yard sprint time (in seconds) and the long-jump distance (in inches) for a small statistics class with 12 students. A scatterplot with the least-squares regression line and a residual plot are shown below.



Minitab

Predictor	Coef	SE Coef	T	P
Constant	414.79	60.10	6.90	0.000
Sprint (s)	-45.743	9.419	-4.86	0.001

S = 22.3762    R-Sq = 70.2%    R-Sq(adj) = 67.2%

**Questions:**

- What is the equation of the least-squares regression line that describes the relationship between sprint time and long jump distance? Define any variables that you use.
- Interpret the slope of the regression line in context.
- Find the correlation.
- Describe what the Coefficient of Determination tells you (in plain English).
- What does  $s = 22.3762$  tell us?
- Is a line an appropriate model to use for these data? Explain how you know.
- What is the predicted long jump distance for a student who ran the 40 in 5.75 seconds?