

**Linear Regression Review**

1. An emergency service wishes to see whether a relationship exists between the high outside temperature on a given day and the number of emergency calls it receives. They examine data from 10 randomly selected days last year. The data is as follows:

<b>Temperature</b>	74	82	88	67	93	99	101	78	85	90
<b>No. of Calls</b>	4	8	10	8	11	14	13	6	8	10

- Find the least squares regression line. State the equation.
- Interpret the slope.
- Interpret the y-intercept.
- Find and interpret the value of  $r^2$ .
- Create a residual plot on your calculator. What does this plot tell you about a linear model for this data? How do you know?
- Find and interpret the residual for  $93^\circ$ .
- What point represents the largest residual? What does that residual mean?

2. The decline of salmon fisheries along the Columbia River in Oregon has caused great concern among commercial and recreational fishermen. The paper "Feeding of Predaceous Fishes on Out-Migrating Juvenile Salmonids" gave the accompanying data on  $y$  = maximum size of salmonids consumed by a northern squaw fish and  $x$  = squawfish length, both in millimeters. The accompanying data is from MINITAB

Predictor	Coef	Stdev	t-ratio	p
Constant	-89.09	16.83	-5.29	0.000
length	0.72907	0.04778	15.26	0.000
s=12.56		R-sq=96.3%		

- Write the least squared regression line equation.
- Interpret the slope in context of the problem.
- What is the correlation coefficient? Interpret this value.
- What value of maximum size would you predict for a squawfish whose length is 375 mm?
- What is the residual corresponding to the observation (375,165)? Interpret this value.
- What is the correlation coefficient to describe this relationship?
- What proportion of observed variation in  $y$  can be attributed to the approximate linear relationship between the two variables?