

AP Statistics Review Chapter 3 and Inference about Regression

Does seat location matter?

(YOU DONOT NEED YOUR CALCULATOR, JUST YOUR MEMORY OR NOTES FROM CHAPTER 3)

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 and recorded the test score for each student at the end of the chapter. The explanatory variable in this experiment is which row the students were assigned (row 1 is closest to the front and row 7 is the farthest away). Here are the results, including a scatterplot and least-squares regression line:

Row 1: 76, 77, 94, 99

Row 2: 83, 85, 74, 79

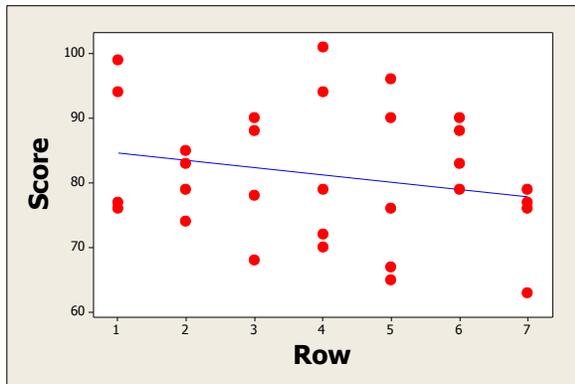
Row 3: 90, 88, 68, 78

Row 4: 94, 72, 101, 70, 79

Row 5: 76, 65, 90, 67, 96

Row 6: 88, 79, 90, 83

Row 7: 79, 76, 77, 63



1. From the scatterplot, describe the relationship between seat location and test scores.
2. Explain why it was important to randomly assign the students to seats rather than letting each student choose his or her own seat.

Here is computer output for the least-squares regression analysis on the seating chart data

Regression Analysis: Score versus Row

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%

Problem:

3. State the equation of the least-squares regression line. Define any variables you use.
4. Interpret the slope, y intercept, correlation coefficient, coefficient of determination, and standard deviation of the residuals, in context to this problem.

Does the negative slope provide convincing evidence that sitting closer causes higher achievement or is it plausible that the association is due the chance variation in the random assignment?

5. Check whether the conditions for performing inference about the regression model are met.
6. Identify the standard error of the slope SE_b from the computer output. Interpret this value in context.
7. Calculate the 95% confidence interval for the true slope. Show your work.
8. Interpret the interval from question #7) in context.
9. Based on your interval, is there convincing evidence that seat location affects scores?
10. Use a significant test to verify your answer in question 9.