2008 AP® STATISTICS FREE-RESPONSE QUESTIONS

STATISTICS
SECTION II
Part B
Question 6
Spend about 25 minutes on this part of the exam.
Percent of Section II score—25

Directions: Show all your work. Indicate clearly the methods you use, because you will be graded on the correctness of your methods as well as on the accuracy and completeness of your results and explanations.

6. Administrators in a large school district wanted to determine whether students who attended a new magnet school for one year achieved greater improvement in science test performance than students who did not attend the magnet school. Knowing that more parents would want to enroll their children in the magnet school than there was space available for those children, the district administrators decided to conduct a lottery of all families who expressed interest in participating. In their data analysis, the administrators would then compare the change in test scores of those children who were selected to attend the magnet school with the change in test scores of those who applied to attend the magnet school but who were not selected.

The tables below show the scores on the same science pretest and the same science posttest for 20 students. Of the 20 students, 8 were randomly selected from the magnet school and 12 were randomly selected from those who applied to attend the magnet school but who were not selected and then attended their original school.

Magnet School		
Pretest Score	Posttest Score	Posttest − Pretest
80	97	17
78	98	20
86	84	−2
78	79	1
64	89	25
71	77	6
71	83	12
73	88	15
$\bar{x} = 75.125$	$\bar{x} = 86.875$	$\bar{x} = 11.750$
$s = 6.770$	$s = 7.699$	$s = 9.407$

Original School		
Pretest Score	Posttest Score	Posttest − Pretest
83	80	−3
80	89	9
63	65	2
79	78	−1
83	93	10
77	79	2
66	70	4
80	84	4
73	80	7
90	90	0
77	78	1
90	91	1
$\bar{x} = 78.417$	$\bar{x} = 81.417$	$\bar{x} = 3.000$
$s = 8.207$	$s = 8.512$	$s = 3.977$

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(c) To determine whether there is a significant correlation between pretest score and posttest score, a test of the following hypotheses will be performed.

H_0 : There is no correlation between pretest score and posttest score (true slope $= 0$)

versus

H_a : There is a correlation between pretest score and posttest score (true slope $\neq 0$)

(i) Using the regression output, state the p-value and conclusion for this test at the magnet school. Assume the conditions for inference have been met.

(ii) Using the regression output, state the p-value and conclusion for this test at the original school. Assume the conditions for inference have been met.

(d) What additional information do the regression analyses give you about student performance on the science test at the two schools beyond the comparison of mean differences in part (a) ?