

REVIEW

1. Joe claims that Stanford students are smarter than Berkeley students. To prove his claim he compares the average GPA for the students in Berkeley's Fall 89 stat 2, sect 1 class with the average GPA for students in a similar course at Stanford. There are 45 students in the Berkeley class and 30 students in the Stanford class. The average GPA is 2.9 with an SD of 0.25 for the Berkeley students. For the Stanford students the average GPA is 3.3 and the SD of the sample is 0.22. (Note the divisor $n - 1$ rather than n is used in calculating the sample SD).

Joe proceeds with the following calculations:

$$\frac{3.3 - 2.9}{\frac{(45 \cdot 0.25) + (30 \cdot 0.22)}{75}} = 1.681$$

Joe says that according to the normal distribution, the chance that the Stanford students are smarter than Berkeley students is

$$\mathbf{P}(\mathcal{N}(0, 1) \geq 1.681) \approx .046$$

Therefore, Stanford students are smarter than Berkeley students at the $\alpha = 0.05$ level.

There are many things wrong with Joe's analysis. What is wrong with his assumptions, hypothesis test, and conclusions?

2. Three procedures for dying yarn are compared in the table below.

A	B	C
-0.28	0.38	-1.15
0.36	0.40	-0.9
0.87	1.19	0.59
1.2	1.87	1.2
1.6	2.4	1.99

Construct an ANOVA table to test whether all three procedures have the same mean. Clearly state your assumptions and conclusions.

3. One hundred subjects are chosen at random to participate in a training program. Each subject is administered a test before and after the training program. The pretest average is 50. Each subject scored at least 5 points more on the post test score. The SD's of both test scores is 15 points, and the histograms are normal looking.

(a) The average post test score is greater than or equal to 55. T/F. Explain.

(b) The correlation between pre and post test scores must be positive. T/F Explain.

(c) Approximately, 68% of the participants scored between 35 and 65 on the pretest. T/F Explain.

(d) Suppose the post test scores averaged 60 and the sample correlation between is .60. Do we have enough information to test the hypothesis that the training program does not help in taking the test? If so, do so. If not, explain.

4. A simple random sample of 2,237 Americans found

	Male	Female
Right handed	934	1070
Left handed	113	92
Ambidextrous	20	8

Are handedness and sex independent?

5. Consider the model

$$Y = e^{b+cx^2} E,$$

where E has mean 1 and finite variance.

Find the linear least squares estimates of b and c based on n observations, $(x_1, y_1), \dots, (x_n, y_n)$.