

Assignment #3

This assignment is due in class next Thursday, February 11, 1999. As with previous assignments, I expect that you will talk to classmates about the assignment, but expect each of you to do the work yourself.

(1) A firm that manufactures commercial adhesives is using a simple search method to find better compounds. It has a collection of 12,000 ingredients that might possibly be combined to make an adhesive. Its search method is, for this example, to look for the best mixture of three of the compounds. For each potential adhesive, it performs a statistical test of its strength versus the current standard adhesive. Each test results in a p-value.

How well must the best new compound found in this search perform (in the sense of a small p-value versus the standard) in order to convince you that the company has really found something?

(2) A large automobile retailer has about 1,000 sales representatives. It would like to offer a prize to its best sales representative, so it finds one with the largest sales during the most recent week. On average, each sales representative generated about \$176,000 in sales that week, with a standard deviation of \$125,000.

(a) Under the usual assumption of normality, how large would you expect the highest sales to be (do this in the “straightforward” way before peeking at the data using only the above summary statistics).

(b) The actual sales generated by a sales representative is \$877,412. Comparing to your estimate in “a”, does this suggest some merit in giving the award to this person, or is this value consistent with sampling variation alone?

(c) Take a look at the sales data. Now that you have seen the data and thought about the problem further, do you think the top seller is distinguished from the others?

(d) What other information would be very useful in deciding if the top seller was doing exceptionally well or just the beneficiary of random mechanisms?

(3) What is another situation, either from the news, your own experiences, other classes, etc., where the issue of multiplicity arises? Briefly describe the situation and why it represents an example of multiplicity. If a decision had to be made in this circumstance, was it made properly?