Professor Joyce Jacobsen

Economics 300
Summer 2010

Assignment #8

Due Wednesday 6/23/10 by 6 p.m. in the Econ 300/QAC201 slot in the Economics Alcove

Please show the calculations used to arrive at your answers. Round final answers to the second decimal place if necessary.

A. A real estate broker employs two appraisers to estimate the value of condominiums for sale and wonders whether the less experienced appraiser (A) is as good as the other (B). As a test, he has each of them appraise the same 5 randomly selected condos, generating the following appraisals:

	Appraised Value (in $000s)	
Condo	by A	by B
1	80	100
2	125	120
3	90	85
4	120	135
5	70	60

1) Calculate a 95% confidence interval for the difference in the average appraisals of A and B.

2) What is the null hypothesis H_0 and the alternative H_A? State them in both words and symbols.

3) Can the null hypothesis be rejected at the 5% level?

4) What is the approximate p-value for H_0? Based on this p-value, would you reject H_0?

B. Does doing well on coursework during the term help one to score well on the final? I reviewed the grades for a sample of 35 students. The data are as follows:

	grade of B or better on coursework	
grade of B or better on final	yes	no
yes:	22	1
no:	4	8

1) State H_0 and H_A in words and in symbols.

2) Based on these data, would you reject H_0?

3) How could a study be designed to resolve the question more convincingly? Does my study show that doing coursework has value?

C. Read problem 9-8 on p. 304. This issue is discussed with regard to scientific journals. Can you think of another realm of life where this tendency to report positive results can be problematic? Make sure your example is clearly stated and that the problems that can arise are made clear as well.

D. Use the data from problems 9-9 and 9-10, except suppose that the purchaser tries to get away with a small sample of only 8 pairs and that he sets the rejection region to be $P \geq 25\%$. For this test, what is α? Suppose the alternative hypothesis is that the new shipments have a 20% rate of defective pairs. For this test, what is β?

E. What are the possible Type I and Type II errors associated with the following test?

[picture of St. Peter standing at the gates of heaven telling a new arrival:
"I'm sorry, but you've been rejected at the 5% level"]

F. Suppose you are playing a simple betting game using a deck of 52 cards in which your opponent draws a card from the deck and if it is black, you win. The card is then replaced in the deck before the next round is played. After 100 rounds, you notice that you have lost 62 times. You begin to wonder if your opponent is palming cards so as to change the ratio of black to red in the deck.

1) What are the null and alternative hypotheses? Find the critical proportion of red cards beyond which you would want to reject H_0 at the 5% level. What is the p-value?

2) Calculate β for a few values of the composite alternative hypothesis and sketch the operating characteristics curve. Explain how to interpret this graph in the context of this problem.

3) You are playing your best friend. With your observation of 62 red cards, what is your decision? Suppose instead that you are playing a stranger, and a friend who is observing the game whispers in your ear that the stranger has a gun in his pocket. Now what is your decision?

G. The CBS News poll regularly asks adults: "Do you think the economy is getting better, getting worse, or staying about the same?" They found that in May 2010, 30% answered "better" (n=1054), while in February 2010, 24% answered "better" (n=1084) [http://www.ropercenter.uconn.edu] .

1) Construct a two-sided confidence interval for the difference in the percentages.

2) Calculate the two-sided p-value for the null hypothesis of no difference.

3) At the 5% level, can H_0 be rejected? Answer this in two ways, making sure the answers agree: Is H_0 excluded from the 95% confidence interval? Does the p-value for H_0 fall below 5%?