UCLA Statistics 10 Practice Final

Page 1 Prof. Lew

A recent report from a private research organization pointed out that at current rates of human consumption, the earth's drinkable water supply will be totally consumed by the year 2025. This report went on to note that "The rich get richer, the poor have children" and then blamed impoverished nations for the depletion of natural resources. Here is some information from the 1997 CIA World Factbook for 10 counties.

Country	Total Fertility Rate (i.e. Average number of Children born per woman)	Per capita Gross Domestic Product (GDP) in dollars (a measure of wealth)	Female Literacy Rate (i.e. women over age 15 who can read and write)
Afghanistan	6.07	\$800	15%
Cambodia	5.81	\$710	22%
Costa Rica	2.85	\$5,500	95%
Indonesia	2.66	\$3,770	78%
Italy	1.16	\$19,600	96%
Jordan	4.94	\$5,000	49%
Nigeria	6.17	\$1,380	47%
Russia	1.35	\$5,200	97%
United Arab Emirates	3.62	\$23,800	80%
United States	2.06	\$28,600	97%

1. What is the correlation between gross domestic product and fertility?

2. What is the regression equation for predicting fertility from per capita Gross Domestic Product?

3. Cuba's GDP is \$1,480. What is the predicted fertility rate for Cuba?

4. Suppose I told you that Cuba's fertility rate is actually 1.54. Is the result you got in (3) different from 1.54? If it is different, give us some reasons why your predicted result might different from 1.54. If there is no difference, give us some reasons why your prediction is exactly on target.

Your company advertises that it ships 90% of its orders on time, that is, within 5 working days. The average shipping time of all orders is 3.1 days with a standard deviation of 0.4 days. You select a simple random sample (SRS) of 21 of the 10,000 orders received in the past week for an audit. The audit reveals that 18 of the 21 orders were shipped within 5 working days.

5. What is the sample percentage of orders shipped on time and what is the standard error for the percentage of orders shipped on time?

6. A lawyer approaches you and says "Aha! You claim 90% but in your own sample the percentage is lower than that. So your 90% claim is wrong." Does the lawyer have enough evidence to sue you for false advertising? Perform a test and use a 5% level of significance as your rule. Explain why the results of your test refute or do not refute your 90% claim.

7. There are 20,000 restaurants in the County of Los Angeles. A sample of 200 restaurants is drawn at random. The average monthly sales per restaurant are \$12,500 and the standard deviation is \$5,600.

Pick one of the choices below and fill in the blanks

(i) A 90% confidence interval for the average monthly sales in the sample is

_____ to _____.

(ii) A 90% confidence interval for the average monthly sales in the county is

_____ to _____.

(iii) 90% of the restaurants in the county have average monthly sales between

_____ to _____.

A black box has a slot on top that is just wide enough to insert your hand. The box has six tickets in it. The tickets are labeled "1, 2, 3, 4, 5, 6". 10 draws will be made at random with replacement from this box.

8. What is the expected value for the average of the 10 draws and what is the standard error?

9. After 10 draws, your average is 3.9. Your best friend comes by and draws ten at random with replacement too. Your friend's average is 5.7. What is the chance that the average will be between 3.9 and 5.7?

10. You noticed that when your friend drew from the box, s/he seemed to draw a lot of tickets labeled "6". What is the chance of having an average of 5.7 from 10 draws from this box? Is there evidence to suggest that your friend might have "X-ray vision (like Superman)" or could it just be luck? State the null hypothesis and alternative hypothesis, perform a test, state the p-value and give us your conclusions.

11. What is the chance that on the first four draws you will pick the ticket labeled "6" each time?

Twelve jurors were selected at random from a large pool of prospective jurors. The twelve were shown a crime scene and then asked to give it a brutality rating where -5 = no brutality whatsoever; +5= the most brutal crime ever; and a rating of 0 = about average in brutality.

The twelve scores were:

5, -3, 1.5, -1.5, 2, 0, 3, 4, 1, -3.5, 2, -5

12. Calculate the median and standard deviation of this list.

13. Suppose a criminologist came in and transformed the scores by adding 5 to each of them and then multiplying each one by 9. What is the inter-quartile range of this list now? What is the standard deviation now?

14. Test the hypothesis that the larger pool of jurors would judge that this crime is about average in brutality using the information from this sample of 12 jurors. State the null and alternative hypotheses, perform a test, state the resulting p-value and give us your conclusions.

The Public Health Service studied the effects of wine drinking on cholesterol in a large sample of representative households in the United States and in France. For men and for women in each age group in both counties, those who had drank moderate amounts of wine had lower cholesterol levels than those who drank no wine. But in the U.S. those who drank no wine had lower cholesterol levels than those who drank large amounts of wine. In France, those who drank no wine had higher cholesterol levels than those who drank large amounts of wine.

15. Why did they study men and women and the different age groups separately?

16. The lessons one learns from this study seems to be, if you drink lots of wine and are concerned about your cholesterol levels, you should live in France (if you do not already) and if you do not drink wine (and are concerned about your cholesterol levels), you should live in the United States. Is this correct? Explain. Be brief.