Test 3

CIT 32000
Altom
Spring 2014

Name ____________________________________

Important Notes:

- There are parts of the test that rely on material I covered in class, and may not appear in the book.
- In cases where I ask you for explanations or interpretations, I am prepared to accept a wide range of views ***if*** you can provide a strongly reasoned argument. You must convince me. Present whatever evidence seems compelling.
- Use these pages as scratch paper. Show your work on all problems. Use the backs of the pages if necessary.
- Calculators and stats software may be used, but show your work wherever possible. I give partial credit for thinking through problems even if they have the wrong answer.
- Remember to read the problem carefully before beginning. Be meticulous and think carefully.
- Return this test promptly. It must be in my hands by the beginning of the class period when it is due. I cannot accept late submissions.

For each of the following, state which test is most appropriate to the situation. Be sure to specify the *exact* test. For example, a paired t-test would not be appropriate in the same circumstances as an independent t-test. And keep in mind that "test" may apply to a wide range of procedures, including, for example, confidence intervals or correlations.

1. A study is conducted to determine if time of day has any effect on test grades. An introductory psychology class is selected for the study, because it has a standard curriculum taught across many sections. Two classes are selected for each time period: 8:00 AM, 1:00 PM, and 5:30 PM. Out of the total pool of around 40 students for each time period, 15 students are selected at random, for a total of 45. The test is administered to all students, and the test results for the study subjects are placed in SPSS. We want to know if there is a statistical difference between these time periods. What test is appropriate?

____(5 pts)

2. Hicks law predicts how long it will take a user to pick out a given element on a website page from among all the other elements on that page. Because a certain website will be used many thousands of times per year on an intranet, a major company engages a usability specialist to test whether the Hicks prediction holds on two proposed home page designs. Because the company is reluctant to have too many employees absent from work stations, it specifies that the test can involve only five individuals, and that therefore the same five people must test both proposed interfaces. We will want to know if there is a significant difference in the times for each interface. What is the appropriate test?

____(5 pts)

3. Laparoscopic surgery is a procedure for threading a small flexible tube within a patient's body to explore or perform procedures. A recent study was conducted to see what skills a medical student new to laparoscopic surgery might have that would predict shorter learning times. One variable that was gathered was the amount of time a student had spent playing video games before starting his laparoscopic training. The researcher wants to see if the time spent gaming can predict the time needed to perfect laparoscopic skills. What would be the correct test to apply?

____(5 pts)

4. A large company is concerned about turnover, so it commissions a survey that will be given to a random group of 1000 employees. The company then wants to get a general idea of what the results would be in the larger population, but while it will look at significance indicators, it is not heavily interested in significance, but in an estimate of company-wide results. What test would be proper to run here?

____ (5 pts)

A study is conducted into time missed from work, compared with outside temperature. A random sample of 50 employees is extracted from the human resources attendance database and a correlation is conducted. There is found to be an r of .311 at an alpha of .05, two-tailed.

5. What is the critical value of r for the previous paragraph?

____ (5 pts)

6. Is the r from question 5 significant?

____(5 pts)

Refer to the table below. It gives two sets of figures, a predicted rainfall amount from a radar image, and an actual rainfall amount as measured by a standard rain gauge.

(X) Radar Rain Prediction	**(Y) Rain Gauge**
3.6	**.0**
2.0	**1.2**
1.1	**1.2**
1.3	**1.3**
1.8	**1.4**
2.1	**1.4**
3.2	**2.0**
2.7	**2.1**
2.5	**2.5**
3.5	**2.9**
3.9	**4.0**
3.5	**4.9**
6.5	**6.2**
7.3	**6.6**
6.4	**7.8**

$$r = \frac{SS_{xy}}{\sqrt{SS_{xx}SS_{yy}}}$$

$$SS_{xy} = \Sigma x_i y_i - \frac{(\Sigma x_i)(\Sigma y_i)}{n}$$

$$SS_{xx} = \Sigma x_i^2 - \frac{(\Sigma x_i)^2}{n}$$

$$SS_{yy} = \Sigma y_i^2 - \frac{(\Sigma y_i)^2}{n}$$

7. Using the data above and the formulas next to the table, calculate r for the dataset using the method of least squares. (You may use another set of formulas if you like, but these are relatively simple.) Show your work. Use the back of the sheets if necessary.

____(10 pts)

8. Interpret the r value of problem 7. ***Be thorough***.

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____ (5 pts)

9. State the r^2 value of problem 7 and interpret. ***Be thorough in your interpretation***

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____ (5 pts)

10. What is the Y intercept for the data from problem 7?

____ (5 pts)

11. What is the confidence interval of problem 7 for X=3.5 with alpha of .05?

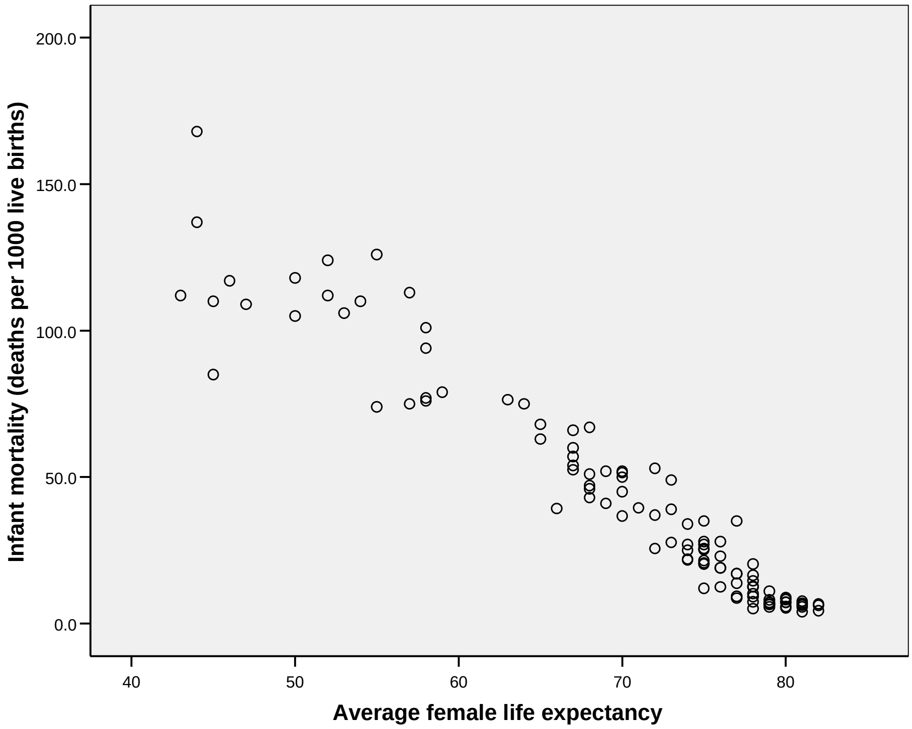
____(10 pts)

12. What is the prediction interval of problem 7 for X=3.5 with alpha of .05?

____(10 pts)

Refer to the following charts and tables for the next questions.

This is a comparison of average female life expectancy around the world, compared with the infant mortality rates.



Model Summary

Model	R	R Square	Adjusted R Square	Sd. Error of the Estimate
1	.962	.926	.925	10.4400

Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
1 (Constant)	285.421	6.741		42.340	.000	272.058	298.785
Average female life expectancy	-3.465	.095	-.962	-36.466	.000	-3.654	-3.277

ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	144940.611	1	144940.611	1329.805	.000
Residual	11662.347	107	108.994		
Total	156602.958	108			

13. What is the n of the samples from the analysis shown above?

______________________ (5 pts)

14. Is the association (correlation) in the data above positive or negative?

____________________________ (5 pts)

15. Write the complete regression equation for the model above. Do not include the random error term.

____ (5 pts)

16. Is regression or correlation an appropriate test for the dataset above? Explain.

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____ (10 pts)

Extra Credit (up to 10 pts)

A survey was taken about whether students and staff parked in lots, or parked in garages. The task now is to see if the differences are significant, and whatever else the data can reveal.

Calculate the chi-square, along with the critical value and significance, of the following data. Show your work. Interpret the result as thoroughly as you can.

	Instructors	Students	Totals
Parked in Lots	80	68	
Parked in Garages	45	57	
Totals			