COURSE: DSCI 3710

Exam 1 Version A

Spring 2016

Print Name:

Signature:

Student ID#: _____

INSTRUCTIONS:

- Please print your name and student ID number on this exam. Also, put your signature on this exam.
- On your scantron PRINT your name and exam version.
- This exam has **25 questions**. You have **75 minutes** to complete this exam. The exam is open book and open notes. You may use a laptop computer or any type of hand calculator but please show all your work on the exam and mark all answers on the scantron. Usage of cell phones, digital cameras and other communication devices is prohibited.
- Please DO NOT pull this exam apart. When you have completed the exam, please turn your scantron and exam booklet into your instructor, at the front desk.
- Good luck and we wish you well on the exam.

Note: Whenever question(s) are connected you may be asked to assume a result (given a value) as an answer for the previous question but this result (value) may or may not be correct. The procedure is set in place to prevent you from losing points on a subsequent question because you made a mistake on some previous question/s.

Use the information given in the following paragraph to answer the first four questions.
225 people are randomly chosen at a shopping mall to taste-test a new brand of fruit drink. They are asked to rate the drink on a scale from 1 to 7, with 1 being very bad and 7 being very good. The results of the survey reveal that the average rating is 5.60 with a standard deviation of 1.35. The marketing division of the fruit drink distributor is only interested in selling this drink if the true mean rating is more than 5.15.

1. What is the **alternative hypothesis** for testing whether the fruit drink distributor should sell this drink?
   A. $H_a: \mu \neq 5.15$
   B. $H_a: \mu = 5.60$
   C. $H_a: \mu > 5.60$
   D. $H_a: \mu < 5.15$
   E. $H_a: \mu > 5.15$*

2. What is the **calculated** value of the test statistic?
   A. 1.28
   B. 1.96
   C. 5.00*
   D. 2.86
   E. 1.65

3. What is the rejection region for testing at the **0.025 level of significance** whether the fruit drink distributor should sell this drink?
   A. $Z \geq 1.645$
   B. $Z \geq 1.96$*
   C. $Z \leq -1.28$
   D. $Z \leq -1.96$
   E. $Z \geq 1.28$

4. **Assuming** the calculated value of the test statistic is **3.25**, what is the conclusion of testing at the **.10 level of significance** whether the fruit drink distributor should sell this drink?
   A. Based on the sample data, there isn't sufficient evidence to conclude that the average rating is more than 5.15.
   B. Based on the sample data, there is sufficient evidence to conclude that the average rating is more than 5.15.*
   C. Based on the sample data, there isn't sufficient evidence to conclude that the average rating is no more than 5.15.
   D. Based on the sample data, there is sufficient evidence to conclude that the average rating is no more than 5.15.
   E. None of the above.

Use the information given in the next paragraph to answer the next four questions.
The table below shows the productivity index scores of 10 employees who participated in a productivity improvement program during one month period. The productivity index scores shown are those before and after completing the program, for each employee. Test whether there is significant improvement in the productivity after the training (an increase in the productivity index score). Excel analysis at the **1% significance level** is shown.

Employee	Before (1)	After (2)
1	96	94
2	77	83
3	64	75
4	86	89
5	xx	yy
6	52	51
7	61	68
8	xx	yy
9	63	68
10	60	70

t-Test: Paired Two Sample for Means

	Before	*After*
Mean	71.3	76.2
Variance	185.5667	157.9556
Observations	10	10
Pearson Correlation	0.952981	
Hypothesized Mean Difference	0	
df	9	
t Stat	-3.73501	
P(T<=t) one-tail	0.002331	
t Critical one-tail	2.821438	
P(T<=t) two-tail	0.004661	
t Critical two-tail	3.249836	

5. What is the **alternative hypothesis** for testing the belief that there was **an increase in the mean of the productivity index scores** after the productivity improvement program?
   A. Ha: $\mu_2 > 0$
   B. Ha: $\mu_1 > \mu_2$
   C. Ha: $\mu_1 \neq \mu_2$
   D. Ha: $\mu_1 < \mu_2$ *
   E. Ha: $\mu_1 = \mu_2$

6. What is the table value (at the 1% level) of the appropriate **critical test statistic** to test the belief that there is an **increase** in the mean productivity index scores of employees who go through the productivity improvement program?
   A. 3.2498 B. 0.0023 C. -3.7350 D. 2.8214* E. 0.0047

7. What is the p-value for testing the hypothesis that there is an **increase** in the mean of the productivity index scores of employees who participated in the productivity improvement program?
   A. -3.7350 B. 0.0047 C. 0.00233* D. 2.8214 E. 0.0122