

**COURSE: DSCI 3710**

**Print Name:** \_\_\_\_\_

**Exam 1 – version A**

**Signature:** \_\_\_\_\_

**Spring 2010**

**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. To better protect your privacy also print your name on the backside of your scantron.
- You have **105 minutes** to complete this exam. The exam is open book, open notes, and open mind. You may use 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, PDAs, and other communication devices is strictly prohibited.
- Many of the questions follow the format of those in Hawkes Learning Systems Business Statistics. The remaining questions are either based on the Excel assignments or use an HLSBS-like approach with problems nearly identical to those assigned in the textbook.
- Please **DO NOT** pull this exam apart. When you have completed the exam, please turn in your scantron and exam booklet to your instructor, at the front desk.
- No cheating.
- 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 below to answer the 4 questions that follow:

A corporation randomly selects 150 salespeople and finds that 125 who have never taken a self-improvement course that would like a course. The firm did a similar study 10 years ago in which 120 of a random sample of 160 salespeople wanted a self-improvement course. The groups are assumed to be independent random samples. Let  $p_1$  and  $p_2$  represent the true proportion of workers who would like to attend a self-improvement course in the current study and the past study respectively. The firm wants to test whether their current course recruitment efforts resulted in a greater proportion of workers that want to attend a self-improvement course than in the past.

Z Test for Two Proportions			
	Variable 1	Variable 2	
Sample Proportion	0.833333	0.750000	
Number of Observations	150	160	
Ho: XXX	Ha: XXX		
Z*	1.801215		
P[Z $\leq$ Z*]	0.035835		
Z Critical, $\alpha = 0.01$	X.XX		
99% CI for $p_1 - p_2$	-0.035026	to	0.201692

- What are the correct null and alternative hypotheses for the above situation?
  - Ho:  $\mu_1 \geq \mu_2$  Ha:  $\mu_1 < \mu_2$
  - Ho:  $p_1 \leq p_2$  Ha:  $p_1 > p_2$
  - Ho:  $p_1 = p_2$  Ha:  $p_1 \neq p_2$
  - Ho:  $p_1 \geq p_2$  Ha:  $p_1 < p_2$
  - Ho:  $\mu_1 = \mu_2$  Ha:  $\mu_1 \neq \mu_2$
- What is the critical value for testing the hypotheses for this problem if  $\alpha = 0.01$ ?
  - 1.645
  - 1.96
  - 2.33\*
  - 2.57
  - 1.28
- What is the calculated value of the test statistic for the above statistical test?
  - 0.09
  - 0.18
  - 0.16
  - 1.80\*
  - 0.72
- What are the decision and conclusion of the test at the significance level of 0.01?
  - Fail to reject the null hypothesis, conclude there is sufficient evidence that the proportion of workers that want to attend the course has decreased.
  - Reject the null hypothesis, conclude there is no evidence of difference in proportions.
  - Fail to reject the null hypothesis, conclude there is insufficient evidence that the proportion of workers that want to attend the course has increased.\*
  - Reject the null hypothesis, conclude there is evidence that the proportion of workers that want to attend the course has increased.
  - Fail to reject the null hypothesis, conclude there is sufficient evidence of difference in proportions.

Use the information given below to answer the four (4) questions that follow:

The Glen Valley Steel Company manufactures steel bars. If the production process is working properly, it turns out steel bars with an average length of at least 2.75 feet with a standard deviation of 0.20 foot (as determined from engineering specifications on the production equipment involved). Longer steel bars can be used or altered, but shorter bars must be scrapped. A sample of 25 bars is selected from the production line. The sample indicates an average length of 3.08 feet. The company wishes to determine whether the process is making short bars because if it is, then the production equipment needs an immediate adjustment.

t Test for Population Mean	
Number of Observations	25
Sample Standard Deviation	0.606218
Sample Mean	3.080000
Ho: $\mu \geq X.XX$	Ha: $\mu < X.XX$
T*	2.721794
P[T $\geq$ T*]	0.994052
T Critical, $\alpha = 0.05$	-1.710882
95% CI for Pop. Mean	2.829766 to 3.330234

5. State the null and alternative hypothesis.
  - A. Ho:  $\mu \geq 2.75$ ; Ha:  $\mu < 2.75$  \*
  - B. Ho:  $\mu < 2.75$ ; Ha:  $\mu \geq 2.75$
  - C. Ho:  $\mu \geq 2.75$ ; Ha:  $\mu \neq 2.75$
  - D. Ho:  $\mu = 2.75$ ; Ha:  $\mu \neq 2.75$
  - E. Ho:  $\mu \geq 2.75$ ; Ha:  $\mu = 2.75$
  
6. What is the degree of freedom?
  - A. 25
  - B. 24\*
  - C. 26
  - D. 27
  - E. 28
  
7. At the 10% level of significance, where is the Reject Ho region?
  - A. To the left of T = -1.318 \*
  - B. To the left of T = -1.645 and to the right of T = 1.645
  - C. To the left of Z = -1.328 and to the right of Z = 1.328
  - D. To the right of T = -1.711
  - E. To the left of T = -1.960