SOLUTIONS

King Fahd University of Petroleum & Minerals
Department of Mathematical Science
STAT-212-Term043-I -Quiz #3

Name: ID: Serial:

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(5) Question One (5-Points)

In a large company of car batteries, it is assumed that the life batteries is approximately normally distributed. If a manufacturer of that company claims that the batteries life has a standard deviation more than 0.9 year, test his claim if a sample of 10 batteries yields a standard deviation of 1.2 years. Use $\alpha = 0.05$

1. $H_0: \sigma^2 \le (.9)^2 = 0.81$ vs $H_A: \sigma^2 > 0.81$ (1)

2. $\chi^2_c = \frac{(n-1)S^2}{\sigma_0^2} = \frac{(10-1)(1.2)^2}{0.81} = 16$ (1)

3. $\chi^2_{\alpha, n-1} = \chi^2_{.05,9} = 16.9190$ (1)

Reject H_0 if $\chi^2_c > \chi^2_{\alpha,n-1} \Rightarrow 16 \not> 16.9190$ ∴ Do not reject H_0. (1)

4. Based on the sample data, a manufacturer claim is not true. (1)

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(5) Question Two (5-Points)

A study is conducted to compare the length of time between men and women to assemble a certain product .Past experience indicate that the distribution of times for both men and women is approximately normal. A random sample of times for 11 men and 14 women produced the following data:

Men	Women
$n_1 = 11$	$n_2 = 14$
$S_1 = 6.1$	$S_2 = 5.3$

Do these data provide a sufficient evidence to conclude that the variance for men is more than women? Test using $\alpha = 0.05$

1. $H_0: \sigma_1^2 \le \sigma_2^2$ vs $H_A: \sigma_1^2 > \sigma_2^2$ (1)

2. $F_c = \frac{S_1^2}{S_2^2} = \frac{(6.1)^2}{(5.3)^2} = 1.32467$ (1)

3. $F_{\alpha, n_1-1, n_2-1} = F_{.05,10,13} = 2.671$ (1)

Reject H_0 if $F_c > F_{\alpha, n_1-1, n_2-1}$

$1.32467 \not> 2.671$ ∴ Do not reject H_0. (1)

4. The variance for men is not more than it for women. (1)