SOLUTIONS

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

Name: ID: Serial:

(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) 1. $H_0: \sigma^2 \le (.9)^2 = 0.81$ vs $H_A: \sigma^2 > 0.81$, $n = 10$, $S = 1.2$

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

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

Reject H_0 if $\chi^2_c > \chi^2_{\alpha, n-1} \Rightarrow 16.0 \not> 16.9190$ ∴ Do not reject H_0. (1)

(1) 4. A manufacturer claim is not true, based on the sample data.

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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 different from women? Test using $\alpha = 0.05$

1. $H_0: \sigma_1^2 = \sigma_2^2$ vs $H_A: \sigma_1^2 \neq \sigma_2^2$ (1)

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

3. $F_{\alpha/2, n_1-1, n_2-1} = F_{.025, 10, 13} = 3.250$ (1)

Reject H_0 if $F_c > F_{\alpha/2, n_1-1, n_2-1} \Rightarrow 1.32467 \not> 3.250$

∴ Do not reject H_0. (1)

4. The variances for men and women are not different based on the sample data. (1)