SOLUTIONS

King Fahd University of Petroleum & Minerals
Department of Mathematical Science
STAT-212-Term051-I -Quiz #3

Name: ID: Serial:

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 0.85 year, test his claim if a sample of 10 batteries yields a standard deviation of 1.1 years. Use $\alpha = 0.05$

$n = 10$, $S = 1.1$, $\alpha = .05$

1. $H_0: \sigma^2 \le (.85)^2 = .7225$ VS $H_A: \sigma^2 > (.85)^2 = .7225$ } (1)

2. $\chi^2_c = \frac{(n-1)S^2}{\sigma_0^2} = \frac{(10-1)(1.1)^2}{(.85)^2} = 15.0727$ } (1)

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

Reject H_0 if $\chi^2_c > \chi^2_{\alpha,n-1} \Rightarrow 15.0727 \not> 16.9190$

$\therefore$ Do not reject H_0 } (1)

4. Conclusion: Batteries life has a standard deviation NOT more than .85 year. (The claim is not correct). (1)

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~~ 10 men and ~~14~~ 15 women produced the following data:

Men	Women
$n_1 = 10$	$n_2 = 15$
$S_1 = 6.15$	$S_2 = 5.31$

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

$n_1 = 10$, $n_2 = 15$

$S_1 = 6.15$, $S_2 = 5.31$

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

2. $F_c = \frac{S_1^2}{S_2^2} = \frac{(6.15)^2}{(5.31)^2} = 1.3414$. } (1)

3. $F_{\alpha,n_1-1,n_2-1} = F_{.05,9,14} = 2.646$. } (1)

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

$1.3414 \not> 2.646$

Do not reject H_0. } (1) pt

4. Conclusion: The variance for men is NOT more than women. (The claim is not correct). (1) pt.