

King Fahd University of Petroleum & Minerals
 Department of Mathematical Science
 STAT-212-Term061 – Quiz2

Name: _____

ID: _____

Serial: _____

You are given the following information:

Sample 1	Sample 2
$n_1 = 14$	$n_2 = 14$
$S_1 = 2.5$	$S_2 = 1.8$
$\bar{x}_1 = 17.2$	$\bar{x}_2 = 15.9$

a. Test using $\alpha = 10\%$ to determine whether there is a difference between the two population means.

1. Hypothesis : $H_o : \mu_1 - \mu_2 = 0$ VS $H_A : \mu_1 - \mu_2 \neq 0$

2. Test Statistics:

$$t_c = \frac{\bar{x}_1 - \bar{x}_2 - 0}{S_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

$$S_p = \sqrt{\frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2}} = \sqrt{\frac{(14 - 1)(2.5)^2 + (14 - 1)(1.8)^2}{14 + 14 - 2}}$$

$$= \sqrt{4.745} = 2.1783$$

$$So, t_c = \frac{17.2 - 15.9 - 0}{(2.1783) \sqrt{\frac{1}{14} + \frac{1}{14}}} = 1.5790$$

3. Decision Rule: Reject H_o if $|t_c| > t_{\frac{\alpha}{2}, n_1 + n_2 - 2}$ where

$$t_{\frac{\alpha}{2}, n_1 + n_2 - 2} = t_{0.05, 26} = 1.7056$$

4. Decision : because $1.5790 \not> 1.7056$ do not reject H_o

5. Conclusion: there is no difference between the two population means

b. State the required assumptions needed to perform the test in (a)

- 1.** The two populations are normally distributed
- 2.** Population variances are unknown but equal
- 3.** Samples are small and independent.