

## Answer on Question #78914 – Math –Statistics and Probability

We need to check the hypothesis

$$H_0: \mu_1 = \mu_2 \quad \text{vs.} \quad H_a: \mu_1 \neq \mu_2$$

with the significance level (a)  $\alpha = 0.01$ , (b)  $\alpha = 0.05$ .

The test statistic

$$t = \frac{\mu_1 - \mu_2}{\sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2} \left( \frac{1}{n_1} + \frac{1}{n_2} \right)}} = 4.56$$

where  $\mu_1 = 107$ ,  $s_1 = 10$ ,  $n_1 = 16$ ,  $\mu_2 = 112$ ,  $s_2 = 8$ ,  $n_2 = 14$ .

The critical value is  $t_{cr} = t_{0.995;28} = 2.76$  for  $\alpha = 0.01$ , and  $t_{cr} = t_{0.975;28} = 2.05$  for  $\alpha = 0.05$ . Since in both cases  $|t| > t_{cr}$  then we reject the null hypothesis  $H_0$  and we conclude that there a significant difference between IQs of the two groups at significance level of 0.01 and 0.05.