Answer on Question #84114 – Math – Statistics and Probability

Question

The following data were obtained from two random samples. Test whether the samples come from the same normal population at 5% level of significance.

No.	Size	Mean	Sum of squares of deviation from mean
1	10	15	90
2	12	14	108

Solution

Two-sample t-test assuming unequal variances (because variances are different).

$$H_0: \mu_1 = \mu_2$$

$$H_\alpha: \mu_1 \neq \mu_2$$

$$df_1 = 10 - 1 = 9$$

$$df_2 = 12 - 1 = 11$$

$$s_1 = \sqrt{\frac{90}{n_1 - 1}} = \sqrt{10} = 3.16$$

$$s_2 = \sqrt{\frac{108}{11}} = 3.13$$

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} = \frac{15 - 14}{\sqrt{\frac{3.16^2}{10} + \frac{3.13^2}{12}}} = \frac{1}{\sqrt{0.99856 + 0.81641}} = 0.742$$

$$t_{0.25} = 2.015$$

Answer: since $t = 0.742 < t_{0.25} = 2.015$, then the samples come from the same normal population.