

Answer on Question #52612 – Math – Statistics and Probability

One wishes to investigate the hypothesis that exercise reduces systolic blood pressure. A 100 person sample from a particular sedentary population indicates that $\mu = 120$ mm Hg with a standard deviation of 8.7 mm Hg. A sample of 33 members of the local running club has a mean systolic pressure of 113 mm Hg and a standard deviation of 9.2 mm Hg.

- a. State H_a
- b. State H_0
- c. What do you conclude at $\alpha = .01$?

Solution

a. $H_a: \mu_1 < \mu_2$

b. $H_0: \mu_1 \geq \mu_2$

c.

We assume that variances are unequal.

Test statistic is

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} = \frac{113 - 120}{\sqrt{\frac{9.2^2}{33} + \frac{8.7^2}{100}}} = -3.84.$$

Critical value for $\alpha = 0.01$ and $100 + 33 - 2 = 131$ degrees of freedom from t-table is

$$t_{crit} = 3.37.$$

We reject the null hypothesis at $\alpha = 0.01$ significance level because test statistic $t = -3.84 < -t_{crit}$.

We can conclude at $\alpha = 0.01$ significance level that exercise reduces systolic blood pressure.