Answer on Question #44955 – Math - Statistics and Probability

Problem.

A public health official claims that the mean home water use is 350 gallons a day. To verify this claim 20 randomly selected homes was studied, with the result that the mean is 353.8 with standard deviation 21.84.

Remark. The question is missed in statement. We will state the null hypothesis, the alternative hypothesis, the test statistic t, the t value for a .05 one tailed critical (rejection) region.

Solution.

Suppose that $\mu_0 = 350$ gallons, $n = 20$, $\bar{x} = 353.8$ gallons, $s = 21.82$ gallons $\alpha = 0.05$.

The null hypothesis is $H_0: \mu = \mu_0$.

The alternative hypothesis is $H_1: \mu > \mu_0$ (we suppose that the mean home use more then 350 gallons in a day).

The test statistic

$$t = \frac{\bar{x} - \mu_0}{s/\sqrt{n}} = \frac{353.8 - 350}{21.82/\sqrt{20}} \approx 0.78.$$

The are $n - 1 = 20 - 1 = 19$. Hence t value for 0.05 one tailed test is critical (rejection) region is $t_\alpha^{(n-1)} = t_{0.05}^{19} = 1.73$. $t_\alpha^{(n-1)} > t$, so we accept null hypothesis and reject alternative hypothesis.