C1

$\bar{X}$ = 5.2 S_X = 2.4 μ_0 = 5.0   α = 5%   n = 300

Population   Aquatics Paint Customers

Quantitative Variable   Preference Score for Organic Orange

Step I Identify Procedure:

We want to test the evidence against the claim that the mean for preference score for Organic Orange in the population of Aquatics Paint customers (μ) is equal to 5.0 (μ_0).

The null and alternative hypotheses are:

H_0: μ = 5.0

H_A: μ > 5.0

Step II Check Conditions:

* Random Sample: A random sample was conducted to insure every member of the population was equally likely to be selected.

* Normal Sampling Distribution: The sampling distribution of all possible sample means has an approximately normal shape because the sample was of sufficient size, over 30 (per the Central Limit Theorem).

*Independence: The lack of replacement is not a problem in this case because the number of subjects in the population is more than 10 times the sample size.

Step III Perform Procedure:

SEE "Graph" Tab

Sampling Distribution: Mean = 5.0   Standard Deviation $= \frac{S_x}{\sqrt{300}} =$ 0.14   Shape: Approximately Normal

t-statistic = $\frac{\bar{X} - \mu_0}{\frac{S_x}{\sqrt{n}}} = \frac{5.2 - 5.0}{\frac{2.4}{\sqrt{300}}} =$ **1.44**

P-Value = P($\bar{X}$ > 5.2 | μ = 5.0) = **7.5%** compared to the Significance Level (α) of 5%

Step IV Interpretation:

We fail to reject the null hypothesis at the 5% significance level (α). The P-value of 7.5% shows that an observed sample mean as extreme as 5.2 ($\bar{X}$) would be expected to occur 7.5% of the time, and thus mere chance could explain the difference between the sample mean and the hypothesized population mean. We cannot say that the mean for preference score for Organic Orange in the population of Aquatics Paint Customers is not equal to the reported mean of 5.0 (μ_0).