

$$\bar{X} = 6.7$$

$$S_x = 1.9$$

$$\mu_0 = 7.0$$

$$\alpha = 5\%$$

$$n = 300$$

Population

Aquatics Paints Customers

Quantitative Variable

Preference Score for Lush Lime

Step I Identify Procedure:

We want to test the evidence against the claim that the mean for preference score for Lush Lime in the population of Aquatics Paints customers (μ) is equal to 7.0 (μ_0).

The null and alternative hypotheses are:

$$H_0: \mu = 7.0$$

$$H_A: \mu < 7.0$$

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 B2" tab for graph of sampling distribution

Sampling Distribution: Mean = **6.7** Standard Deviation = **0.11** Shape= **Approximately Normal**

$$\text{t-statistic} = \frac{\bar{X} - \mu_0}{\frac{S_x}{\sqrt{n}}} = \frac{6.7 - 7.0}{\frac{1.9}{\sqrt{300}}} = \mathbf{-2.7}$$

P-Value = $P(\bar{X} < 6.7 \mid \mu = 7.0) = \mathbf{0.37\%}$ compared to the Significance Level (α) of **5%****Step IV Interpretation:**

We reject the null hypothesis at the **5%** significance level (α). The P-value of **.37%** falls **well below** the significance level, thus there is **strong** evidence that the alternative hypothesis is true, **the preference score for Lush Lime in the population of Aquatics Paints customers (μ) is less than 7.0.**