Business Statistics Mr. Nelson

ONE SAMPLE TEST OF SIGNIFICANCE - MEANS EXAMPLE CLICK HERE ***for what to do before starting four step procedure.***

EXAMPLE DATA & INFORMATION:

$\bar{x}$ = \$93.54 S_x = 22.3 μ_0 = \$89.00 α = 5% n = 36

Population **Female Granada Hills Charter High School students**

Quantitative Variable **Amount spent on shopping in the last month (\$Dollars)**

Note: RED SCRIPT IS INSTRUCTIONAL AND WOULD NOT BE INCLUDED IN YOUR TWO-PAGE, FOUR-STEP PRESENTATION

FORMAL WRITTEN PRESENTATION FOLLOWS

Step I Identify Procedure:

CLICK HERE ***for background on completing Step One of Procedure***

We want to test the evidence against the claim that the mean for the amount spent on shopping in the last month in the population of female Granada Hills Charter High School students (μ) is equal to \$89.00 (μ_0).

The null and alternative hypotheses are:

$$H_0: \mu = \$89.00$$

$$H_A: \mu > \$89.00$$

Step II Check Conditions:

Just list conditions below. CLICK HERE ***for more information on Inference 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 ten times the sample size.**

Step III Perform Procedure:

Leave room for a sketch of the Sampling Distribution.

Sampling Distribution: Mean = $89.00 Standard Deviation = $22.30/(36^.5) Shape: Approximately Normal

Notice we use a t-statistic because we do not know the standard deviation of the population (σ).

As a best alternative available, use the sample's standard deviation (Sx) in the calculation of a t-statistic.

Degrees of freedom (df) are simply the sample size minus one (n - 1)

$$\text{t-statistic} = \frac{\bar{X} - \mu_0}{\frac{S_x}{\sqrt{n}}} = \frac{93.54 - 89.00}{\frac{22.3}{\sqrt{36}}} = \boxed{1.2}$$

P-Value = P(X̄ > $93.54 | μ = $89.00) = $\boxed{11.9\%}$ compared to the Significance Level (α) of 5%

Notice the calculation above considers a t-statistic because we did not know the population standard deviation.
Use T.DIST to calculate the P-value. Also, notice the > requires us to consider 100% - T.DIST %.

Step IV Interpretation: **Determine whether to "Reject Null Hypothesis" or "Fail To Reject Null Hypothesis"**

Use the appropriate paragraph from the Inference Outline, Step Four.

We fail to reject the null hypothesis at the 5% significance level (α). The P-value of 11.9% shows that an observed sample mean as extreme as $93.54 (X̄) would be expected to occur 11.9% of the time, and thus mere chance could explain the difference the sample mean and the hypothesized population mean. We cannot say that the mean for the amount spent on shopping in the last month in the population of female Granada Hills Charter High School students is not equal to the reported mean of $89 ($\mu_0$).

Notice we fail to reject the null hypothesis because the P-value (the probability of getting a sample mean of $93.54 if the population had a mean $89) was 11.9%, higher than the cut-off significance level selected of 5%. This scenario is not rare enough to reject the original hypothesis that the population is centered at $89.

CLICK HERE *to review the final draft of this two-page, four-step inference procedure*
CLICK HERE *for Statistics Greek Letters (μ , ρ, α) go to Insert Symbols: Under Greek & Coptic*