Statistics – TI 84 Calculator

Population MEAN (averages)

CONFIDENCE INTERVALS

Calculator function: **STAT - Tests – Tinterval**

Input: (choose either "stats" – when you have only a summary (mean & std dev) of the data or "data" – when you have all the data in a table or list)

"stats"
$\bar{x}$: sample mean
S_x: sample standard deviation
n: sample size
C-level: confidence level

"data"
list: list that has data ($ex\ L_1$)
freq: 1
C-level: confidence level

Output: (lower number, upper number) {this is the confidence interval}
$\bar{x}$ {sample average}
S_x {sample std dev}
n {sample size}

Interpreting the interval:
"We are _________% confident the true population mean or average is between # and #."

Margin of error: ME = (upper number – lower number) / 2

HYPOTHESIS TESTING

Hypotheses: Null $H_0: \mu = \#$
Alternative $H_A: \mu \neq \#\ \ OR\ \ H_A: \mu < \#\ \ OR\ \ H_A: \mu > \#$

Calculator function: **STAT - Tests - T Test**

Input: choose either "stats" or "data"

"stats"
μ_0: number from hypothesis
$\bar{x}$: sample mean
S_x: sample standard deviation
n: sample size
μ: $\neq$ $<$ $>$ (alternative hypothesis)

"data"
μ_0: number from hypothesis
list: list that has data ($ex\ L_1$)
freq: 1
μ: $\neq$ $<$ $>$ (alternative hypothesis)

Output:
μ {alternative hypothesis}
t {test statistic – the number of std devs the sample is from the null hypothesis}
p {P-value – the probability of getting the sample IF the null hypothesis is true}
$\bar{x}$ {sample mean}
S_x {sample standard deviation}
n {sample size}

Making a Conclusion:

- If P-value < α (the level of significance) then we "reject the null hypothesis" and accept the alternative hypothesis. "There is evidence to suggest that the alternative hypothesis is correct'"

- If P-value > α (the level of significance), then we "fail to reject the null hypothesis" but cannot conclude the null is true; there is not enough evidence to decide if null hypothesis is true or not. "There is insufficient evidence to reject the null hypothesis and accept the alternative."

<u>Confidence Interval without using calculator function T-interval:</u>
(Keep as many decimals as possible. Do not round until the final calculation)

Calculate sample mean and standard deviation: $\bar{x}\ and\ S_x$
Calculate standard error: $SD(\bar{y}) = \frac{S_x}{n}$
Calculate percent outside confidence interval: $a = \frac{(100-CI\ \%)}{2}$ (convert to decimal form)
Calculate the degrees of freedom: $df = n - 1$
Calculate critical value: $t^* = invT(a, df)$
Calculate margin of error: $ME = t^* * SD(\bar{y})$

Confidence interval: $\bar{x} \pm ME$

<u>Hypothesis Testing without using calculator function Ttest:</u>

Calculate sample mean and standard deviation: $\bar{x}\ and\ S_x$
Calculate standard error: $SD(\bar{y}) = \frac{S_x}{n}$
Calculate test statistic: $t = \frac{\bar{x}-\mu_0}{SD(\bar{y})}$
Calculate the degrees of freedom: $df = n - 1$

Calculate P-value: $p = tcdf(lower, upper, df)$

{lower and upper depend upon the alternative hypothesis. Sketch a t-curve centered at null hypothesis, plot the sample mean, and determine if the alternative range is above or below. Remember for a "not equal" alternative to multiply the P-value by 2}