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"	"data"
$\bar{x}$: sample mean	list: list that has data ($ex\ L_1$)
S_x: sample standard deviation	freq: 1
n: sample size	C-level: confidence level
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"	"data"
μ_0: number from hypothesis	μ_0: number from hypothesis
$\bar{x}$: sample mean	list: list that has data ($ex\ L_1$)
S_x: sample standard deviation	freq: 1
n: sample size	μ: $\neq$ $<$ $>$ (alternative hypothesis)
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."

Confidence Interval without using calculator function T-interval:
(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: $\bar{x} \pm ME$

Hypothesis Testing without using calculator function Ttest:

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}