ONE SAMPLE T-TEST

This test is used to determine if a population mean (μ) is reasonable based on a sample mean (x̄).

Researchers believe that women (18-24) get less than the RDA of calcium (1200mg/day).

To test this hypothesis at the \( \alpha = .05 \) significance level, an SRS of 38 women between the ages of 18 and 24 years estimated their daily intakes of calcium (in mg):

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<td>465</td>
<td>1269</td>
<td>1255</td>
<td>1100</td>
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P) STATE POPULATION PARAMETER:

\[ \mu = \text{mean calcium intake of women between 18 and 24 years old} \]

H) STATE HYPOTHESES:

\[ H_0 : \mu = 1200 \quad H_a : \mu < 1200 \]

A) VERIFY CONDITIONS REQUIRED FOR TEST:

a) Random

It was stated that an SRS was used...

b) Normal population or large sample size or justification for normality after omitting outliers

Since the sample size is large, it is safe to use this test because of the Central Limit Theorem

c) Independent

\[ N > 10n > 10(38) > 380 \text{ women (18-24)} \]
T) PUT DATA INTO LIST AND

a) USE TABLE B:

i) Determine mean ($\bar{x}$) and standard deviation (s)

$$\bar{x} = 926 \quad s = 427.2$$

ii) Calculate $t$ statistic

$$t = \frac{\bar{x} - \mu_0}{s} \sqrt{n} = -3.95$$

iii) Determine degrees of freedom

$$df = n - 1 = 38 - 1 = 37 \text{ (Use df = 30 to be conservative)}$$

iv) Determine critical $t$-value and $P$-value

From Table B (df = 30 and $\alpha = .05$), the critical $t$ value is -1.697. Since $-3.95 < -1.697$, the $P$-value < .05.

b) USE CALCULATOR

STATS $\rightarrow$ TESTS $\rightarrow$ T-Test $\rightarrow$ P-value = .00016

DISTR $\rightarrow$ tcdf (min, max, df) = (-100, -3.95, 37) = .000168

S) STATE CONCLUSION:

At $\alpha = .05$ significance level, the study gives evidence that the mean calcium intake of the subjects is less than the RDA of 1200 mg (P-value = .0016). We, therefore, reject the null hypothesis.
CONFIDENCE INTERVAL (Use PAIS):

A 90% confidence interval for the mean daily intake in calcium can be found using:

\[ \text{STAT} \rightarrow \text{TESTS} \rightarrow \text{T Interval} = (809, 1043) \]

We are 90% confident that the average daily intake of calcium for women between the ages of 18 and 24 years old is between 809 mg and 1043 mg which reinforces the findings of the test that women receive less than 1200 mg of calcium/day.