ONE SAMPLE T-TEST

This test is used to determine if a population mean (μ) is reasonable based on a sample mean ($\bar{x}$).

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

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

808	882	1062	970	909	802	374	416	784	997	651	716
438	1420	1425	948	671	696	1156	684	1933	748	1203	2433
1050	976	572	403	626	774	1253	546	1325	446	465	1269
1255	1100										

P) STATE POPULATION PARAMETER:

μ = mean calcium intake of women between 18 and 24 years old

H) STATE HYPOTHESES:

$H_0 : \mu = 1200$ $H_a : \mu < 1200$

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 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 s = 427.2

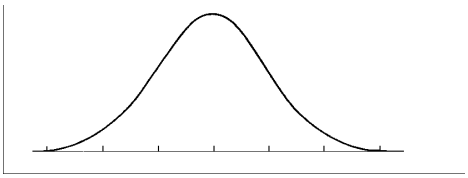
ii) Calculate *t* statistic

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

iii) Determine degrees of freedom

df = n – 1 = 38 – 1 = 37 (Use df = 30 to be conservative)

iv) Determine critical t-value and P-value



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

b) USE CALCULATOR

STATS ⟶ TESTS ⟶ T-Test ⟶ P-value = .00016

DISTR ⟶ tcdf (min, max, df) = (–100, – 3.95, 37) = .000168

S) STATE CONCLUSION:

At α =.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:

STAT ⟶ TESTS ⟶ 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.