

Inference about Two Means: Independent Samples

Testing Hypothesis Regarding the Difference of Two Independent Means

- The samples are obtained using simple random sampling or through a randomized experiment
- The samples are independent
- The populations from which the samples are drawn are normally distributed or the sample sizes are large ($n_1 \geq 30$ and $n_2 \geq 30$)
- For each sample, the sample size is no more than 5% of the population size

Classical Approach (TI-83/84)

1. Write down a shortened version of claim
2. Come up with null and alternate hypothesis (H_0 always has the equals part on it)
3. See if claim matches H_0 or H_1
4. Draw the picture and split α into tail(s)
 - $H_1: \mu_1 \neq \mu_2$ Two Tail
 - $H_1: \mu_1 < \mu_2$ Left Tail
 - $H_1: \mu_1 > \mu_2$ Right Tail
5. Find critical values (t-Distribution table, DF is based on smaller of n_1 or n_2)
6. Find test statistic (2-SampTTest)
7. If test statistic falls in tail, Reject H_0 . If test statistic falls in main body, Accept H_0 . Determine the claim based on step 3

P-Value Approach (TI-83/84)

1. Write down a shortened version of claim
2. Come up with null and alternate hypothesis (H_0 always has the equals part on it)
3. See if claim matches H_0 or H_1
4. Find p-value (2-SampTTest)
5. If p-value is less than α , Reject H_0 . If p-value is greater than α , Accept H_0 . Determine the claim based on step 3

TI-83/84 Instructions

1. STAT Button
2. Right Arrow to TESTS
3. Down arrow and choose 2-SampTInt
4. Enter values and then Calculate

This will give you the interval.

$$\text{Point Estimate} = \frac{UB - LB}{2}$$

$$\text{Margin of Error (E)} = UB - \text{Point Estimate}$$

1. Claim and Confidence Interval

- (a) Test whether $\mu_1 \neq \mu_2$ at the $\alpha = 0.05$ level of significance for the given sample data
- (b) Construct a 95% confidence interval

	Population 1	Population 2
n	20	15
\bar{x}	35	34.2
s	4.3	5.1

2. Claim and Confidence Interval

- (a) Test whether $\mu_1 < \mu_2$ at the $\alpha = 0.05$ level of significance for the given sample data
- (b) Construct a 99% confidence interval

	Population 1	Population 2
n	30	28
\bar{x}	20	18
s	5.2	7