

Two Population Means

σ_1 and σ_2 Unknown

Confidence Interval:

- Final Answer: Lower Value $< \mu_1 - \mu_2 <$ Upper Value
 - Confidence Interval Using TI: STAT > TESTS > 2-SampTInt > ENTER
 - Margin of Error: $E = \frac{\text{C.I. Upper Value} - \text{C.I. Lower Value}}{2}$
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Critical Value(s):

- Using TI Calculator PRGM > TVAL > ENTER (Twice)
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Pooling Option & Degrees of Freedom:

If We Assume	Then Pooled	With Degrees of Freedom
$\sigma_1 = \sigma_2$	Yes	$df = n_1 + n_2 - 2$
$\sigma_1 \neq \sigma_2$	No	$df = \text{Smaller Sample Size} - 1$

Computed Test Statistic & P-Value:

- Using TI Calculator STAT > TESTS > 2-SampTTest
 - Using formula for C.T.S.:
$$t = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$
 - Using tcdf(for P-Value: 2ND > VARS > tcdf(> ENTER
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Example: Consider the chart below:

Sample 1	Sample 2
$n_1 = 20$	$n_2 = 12$
$\bar{x}_1 = 36.5$	$\bar{x}_2 = 31.8$
$s_1 = 7.5$	$s_2 = 10.3$

- Find pooling and df when two population standard deviations are unknown but assumed to be equal.

Solution: We get Pooled: Yes, $df = 20 + 12 - 2 = 30$

- Find pooling and df when two population standard deviations are unknown but assumed to be different.

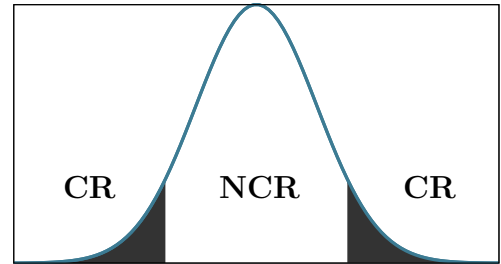
Solution: We get Pooled: No, $df = 12 - 1 = 11$

Hypothesis Testing:

Two-Tail Test:

$$H_0 : \mu_1 = \mu_2$$

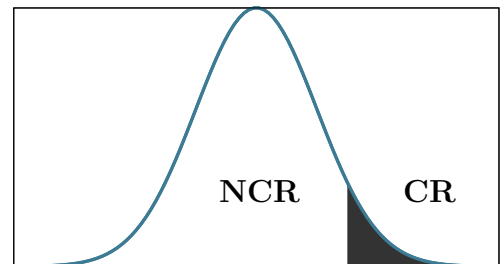
$$H_1 : \mu_1 \neq \mu_2$$



Right-Tail Test:

$$H_0 : \mu_1 \leq \mu_2$$

$$H_1 : \mu_1 > \mu_2$$



Left-Tail Test:

$$H_0 : \mu_1 \geq \mu_2$$

$$H_1 : \mu_1 < \mu_2$$

