Two Population Means

σ_1 and σ_2 Unknown

Confidence Interval:

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

Critical Value(s):

- **Using TI Calculator** **PRGM > TVAL > ENTER (Twice)**

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	$df =$ Smaller Sample Size $- 1$

Computed Test Statistic & P–Value:

- **Using TI Calculator** **STAT > TESTS > 2-SampTest**
- **Using formula for C.T.S.:** $t = \dfrac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\dfrac{s_1^2}{n_1} + \dfrac{s_2^2}{n_2}}}$
- **Using tcdf(for P–Value:** **2ND > VARS > tcdf(> ENTER**

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 $\boxed{\text{Pooled: Yes, } df = 20 + 12 - 2 = 30}$

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

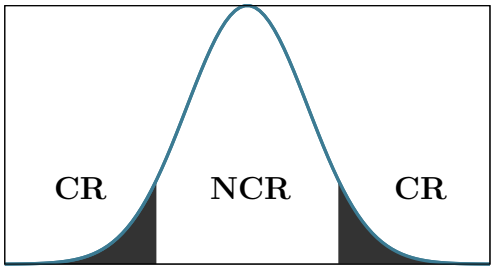
  Solution: We get $\boxed{\text{Pooled: No, } df = 12 - 1 = 11}$

Hypothesis Testing:

Two–Tail Test:

$H_0 : \mu_1 = \mu_2$

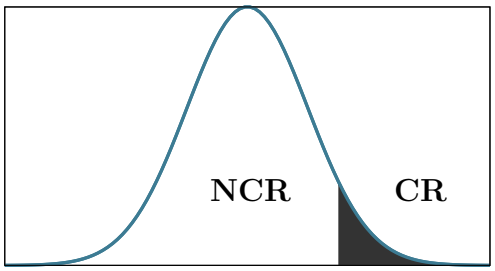
$H_1 : \mu_1 \neq \mu_2$



Right–Tail Test:

$H_0 : \mu_1 \leq \mu_2$

$H_1 : \mu_1 > \mu_2$



Left–Tail Test:

$H_0 : \mu_1 \geq \mu_2$

$H_1 : \mu_1 < \mu_2$