TABLE A - Comparison of a mean with a given value (variance known)

<table>
<tr><td colspan="2">Technical characteristics of the population studied:

Technical characteristics of the sample items:

Discarded observations:</td></tr>
<tr><td>Statistical data

Sample size:

$n=$

Sum of the observed values:

$\sum x =$

Given value:

$m_0=$

Known value of the population variance:

$\sigma^2=$

Or standard deviation:

$\sigma=$

Significance level chosen:

$\alpha =$</td><td>Calculations

$\bar{x} = \frac{\sum x}{n} =$

$[u_{1-\alpha} / \sqrt{n}]\sigma =$

$[u_{1-\alpha/2} / \sqrt{n}]\sigma =$</td></tr>
<tr><td colspan="2">Results

Comparison of the population mean with the given value m_0

Two-sided case:

$$| \bar{x} - m_0 | > [u_{1-\alpha} / \sqrt{n}]\sigma$$

The hypothesis of the equality of the population mean to the given value (null hypothesis) is rejected if:

One-sided cases:

a) The hypothesis that the population mean is not smaller than m_0 (null hypothesis) is rejected if:

$$\bar{x} < m_0 - [u_{1-\alpha} / \sqrt{n}]\sigma$$

b) The hypothesis that the population mean is not greater than m_0 (null hypothesis) is rejected if:

$$\bar{x} > m_0 + [u_{1-\alpha} / \sqrt{n}]\sigma$$</td></tr>
</table>

TABLE A´ - Comparison of a mean with a given value (variance unknown)

<table>
<tr><td colspan="2">Technical characteristics of the population studied:

Technical characteristics of the sample items:

Discarded observations:</td></tr>
<tr><td>Statistical data

Sample size:
$n=$

Sum of the observed values:
$\sum x =$

Sum of the squares of the observed values:
$\sum x^2 =$

Given value:
$m_0=$

Degrees of freedom:
$\nu=n-1$

Significance level chosen:
$\alpha =$</td><td>Calculations

$\bar{x} = \frac{\sum x}{n} =$
$\frac{\sum (x-\bar{x})^2}{n-1} = \frac{\sum x^2 - (\sum x)^2 / n}{n-1}$
$\sigma^* = s = \sqrt{\frac{\sum (x-\bar{x})^2}{n-1}}$

$[t_{1-\alpha}(\nu) / \sqrt{n}]s =$

$[t_{1-\alpha/2}(\nu) / \sqrt{n}]s =$</td></tr>
<tr><td colspan="2">Results

Comparison of the population mean with the given value m_0

Two-sided case:

The hypothesis of the equality of the population mean to the given value (null hypothesis) is rejected if:

$|\bar{x} - m_0| > [t_{1-\alpha/2}(\nu) / \sqrt{n}]s$

One-sided cases:

a) The hypothesis that the population mean is not smaller than m_0 (null hypothesis) is rejected if:

$\bar{x} < m_0 - [t_{1-\alpha}(\nu) / \sqrt{n}]s$

b) The hypothesis that the population mean is not greater than m_0 (null hypothesis) is rejected if:

$\bar{x} > m_0 + [t_{1-\alpha}(\nu) / \sqrt{n}]s$</td></tr>
</table>

TABLE B – Estimation of a mean (variance known)

<table>
<tr><td colspan="2">Technical characteristics of the population studied:

Technical characteristics of the sample items:

Discarded observations:</td></tr>
<tr><td>Statistical data

Sample size:

$n =$

Sum of the observed values:

$\sum x =$

Known value of the population variance:

$\sigma^2 =$

Or standard deviation:

$\sigma =$

Confidence level chosen:

$1-\alpha =$</td><td>Calculations

$\bar{x} = \frac{\sum x}{n} =$

$[u_{1-\alpha} / \sqrt{n}]\sigma =$

$[u_{1-\alpha/2} / \sqrt{n}]\sigma =$</td></tr>
<tr><td colspan="2">Results

Estimation of the population mean m:

$m^* = \bar{x} =$

Two-sided confidence interval:

$\bar{x} - [u_{1-\alpha/2} / \sqrt{n}]\sigma < m < \bar{x} + [u_{1-\alpha/2} / \sqrt{n}]\sigma$

One-sided confidence intervals:

$m < \bar{x} + [u_{1-\alpha} / \sqrt{n}]\sigma$

or

$m > \bar{x} - [u_{1-\alpha} / \sqrt{n}]\sigma$</td></tr>
</table>

TABLE B´ - Estimation of a mean (variance unknown)

<table>
<tr><td colspan="2">Technical characteristics of the population studied:

Technical characteristics of the sample items:

Discarded observations:</td></tr>
<tr><td>Statistical data

Sample size:

$n=$

Sum of the observed values:

$\sum x =$

Sum of the squares of the observed values:

$\sum x^2 =$

Degrees of freedom:

$\nu = n-1$

Confidence level chosen:

$1-\alpha =$</td><td>Calculations

$\bar{x} = \frac{\sum x}{n} =$

$\frac{\sum (x-\bar{x})^2}{n-1} = \frac{\sum x^2 - (\sum x)^2 / n}{n-1}$

$\sigma^* = s = \sqrt{\frac{\sum (x-\bar{x})^2}{n-1}}$

$[t_{1-\alpha}(\nu)/\sqrt{n}]s =$

$[t_{1-\alpha/2}(\nu)/\sqrt{n}]s =$</td></tr>
<tr><td colspan="2">Results

Estimation of the population mean m:

$m^* = \bar{x} =$

Two-sided confidence interval:

$\bar{x} - [t_{1-\alpha/2}(\nu)/\sqrt{n}]s < m < \bar{x} + [t_{1-\alpha/2}(\nu)/\sqrt{n}]s$

One-sided confidence intervals:

$m < \bar{x} + [t_{1-\alpha}(\nu)/\sqrt{n}]s$

or

$m > \bar{x} - [t_{1-\alpha}(\nu)/\sqrt{n}]s$</td></tr>
</table>

TABLE C - Comparison of two means (variance known)

Technical characteristics: { of population 1 / of population 2 Technical characteristics of the sample items taken: { in population 1 / in population 2 Discarded observations: { in sample 1 / in sample 2	
Statistical data Size: First sample $n_1 =$; Second sample $n_2 =$ Sum of the observed values: $\sum x_1 =$; $\sum x_2 =$ Known value of the variances of the population: $\sigma_1^2 =$; $\sigma_2^2 =$ Significance level chosen: $\alpha =$	**Calculations** $\bar{x}_1 = \frac{\sum x_1}{n_1} =$ $\bar{x}_2 = \frac{\sum x_2}{n_2} =$ $\sigma_d = \sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}} =$ $u_{1-\alpha}\sigma_d =$ $u_{1-\alpha/2}\sigma_d =$

Results

Comparison of the two populations means:

Two-sided case:

The hypothesis of the equality of the means (null hypothesis) is rejected if:

$$|\bar{x}_1 - \bar{x}_2| > u_{1-\alpha/2}\sigma_d$$

One-sided cases:

a) The hypothesis that the first mean is not smaller than the second (null hypothesis) is rejected if:

$$\bar{x}_1 < \bar{x}_2 - u_{1-\alpha}\sigma_d$$

b) The hypothesis that the population mean is not greater than the second (null hypothesis) is rejected if:

$$\bar{x}_1 > \bar{x}_2 + u_{1-\alpha}\sigma_d$$

TABLE C´ - Comparison of two means (variance unknown, but may be assumed equal)

Technical characteristics:	of population 1 of population 2	
Technical characteristics of the sample items taken:	in population 1 in population 2	
Discarded observations:	in sample 1 in sample 2	

Statistical data	First sample	Second sample	**Calculations**
			$\bar{x}_1 = \frac{\sum x_1}{n_1} =$
Size:	$n_1=$	$n_2=$	$\bar{x}_2 = \frac{\sum x_2}{n_2} =$
Sum of the observed values:	$\sum x_1=$	$\sum x_2=$	
Sum of the squares of the observe values:	$\sum x_1^2 =$	$\sum x_2^2 =$	$\sum (x_1 - \bar{x}_1)^2 + \sum (x_2 - \bar{x}_2)^2 =$ $\sum x_1^2 + \sum x_2^2 - (\sum x_1)^2 / n_1 - (\sum x_2)^2 / n_2 =$
Degrees of freedom	$\nu = n_1 + n_2 - 2 =$		$\sigma_d^* = s_d = \sqrt{\frac{n_1+n_2}{n_1 n_2} \frac{\sum (x_1 - \bar{x}_1)^2 + \sum (x_2 - \bar{x}_2)^2}{n_1 + n_2 - 2}} =$
Significance level chosen:			$t_{1-\alpha}(\nu) s_d =$
$\alpha =$			$t_{1-\alpha/2}(\nu) s_d =$

Results

Comparison of the two populations means:

Two-sided case:

The hypothesis of the equality of the means (null hypothesis) is rejected if:

$$|\bar{x}_1 - \bar{x}_2| > t_{1-\alpha/2}(\nu) s_d$$

One-sided cases:

a) The hypothesis that the first mean is not smaller than the second (null hypothesis) is rejected if:

$$\bar{x}_1 < \bar{x}_2 - t_{1-\alpha}(\nu) s_d$$

b) The hypothesis that the population mean is not greater than the second (null hypothesis) is rejected if:

$$\bar{x}_1 > \bar{x}_2 + t_{1-\alpha}(\nu) s_d$$

TABLE D - Estimation of difference of two means (variances known)

Technical characteristics:	of population 1 of population 2	
Technical characteristics of the sample items taken:	in population 1 in population 2	
Discarded observations:	in sample 1 in sample 2	

Statistical data	First sample	Second sample	**Calculations**
Size:	$n_1 =$	$n_2 =$	$\bar{x}_1 = \frac{\sum x_1}{n_1} =$
Sum of the observed values:	$\sum x_1 =$	$\sum x_2 =$	$\bar{x}_2 = \frac{\sum x_2}{n_2} =$
Known value of the variances of the population:	$\sigma_1^2 =$	$\sigma_2^2 =$	$\sigma_d = \sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}} =$ $u_{1-\alpha}\sigma_d =$
Confidence level chosen: $1-\alpha =$			$u_{1-\alpha/2}\sigma_d =$

Results

Estimation of the difference of the two populations means m_1 y m_2:

$$(m_1 - m_2)^* = \bar{x}_1 - \bar{x}_2 =$$

Two-sided confidence interval:

$$(\bar{x}_1 - \bar{x}_2) - u_{1-\alpha/2}\sigma_d < m_1 - m_2 < (\bar{x}_1 - \bar{x}_2) + u_{1-\alpha/2}\sigma_d$$

One-sided confidence interval:

$$m_1 - m_2 < (\bar{x}_1 - \bar{x}_2) + u_{1-\alpha}\sigma_d$$

or

$$m_1 - m_2 > (\bar{x}_1 - \bar{x}_2) - u_{1-\alpha}\sigma_d$$

TABLE D´ - Estimation of two means (variance unknown, but may be assumed equal)

Technical characteristics:	of population 1 of population 2
Technical characteristics of the sample items taken:	in population 1 in population 2
Discarded observations:	in sample 1 in sample 2

Statistical data

	First sample	Second sample
Size:	$n_1=$	$n_2=$
Sum of the observed values:	$\sum x_1=$	$\sum x_2=$
Sum of the squares of the observe values:	$\sum x_1^2 =$	$\sum x_2^2 =$
Degrees of freedom	$\nu = n_1 + n_2 - 2 =$	
Confidence level chosen:		
$1-\alpha =$		

Calculations

$$\bar{x}_1 = \frac{\sum x_1}{n_1} =$$

$$\bar{x}_2 = \frac{\sum x_2}{n_2} =$$

$$\sum (x_1 - \bar{x}_1)^2 + \sum (x_2 - \bar{x}_2)^2 =$$

$$\sum x_1^2 + \sum x_2^2 - (\sum x_1)^2 / n_1 - (\sum x_2)^2 / n_2 =$$

$$\sigma_d^* = s_d = \sqrt{\frac{n_1 + n_2}{n_1 n_2} \frac{\sum (x_1 - \bar{x}_1)^2 + \sum (x_2 - \bar{x}_2)^2}{n_1 + n_2 - 2}} =$$

$$t_{1-\alpha}(\nu) s_d =$$

$$t_{1-\alpha/2}(\nu) s_d =$$

Results

Estimation of the difference of the two populations means m_1 y m_2:

$$(m_1 - m_2)^* = \bar{x}_1 - \bar{x}_2 =$$

Two-sided confidence interval:

$$(\bar{x}_1 - \bar{x}_2) - t_{1-\alpha/2}(\nu) s_d < m_1 - m_2 < (\bar{x}_1 - \bar{x}_2) + t_{1-\alpha/2}(\nu) s_d$$

One-sided confidence interval:

$$m_1 - m_2 < (\bar{x}_1 - \bar{x}_2) + t_{1-\alpha}(\nu) s_d$$

or

$$m_1 - m_2 > (\bar{x}_1 - \bar{x}_2) - t_{1-\alpha}(\nu) s_d$$

TABLE E - Comparison of a variance or of a standard deviation with a given value

Technical characteristics of the population studied: Technical characteristics of the sample elements: Discarded observations:	
Statistical data Sample size: $n=$ Sum of the observed values: $\sum x =$ Sum of the squares of the observed values: $\sum x^2 =$ Given value: $\sigma_0^2 =$ Degrees of freedom: $\nu=n-1$ Significance level chosen: $\alpha =$	**Calculations** $\sum (x-\bar{x})^2 = \sum x^2 - \frac{(\sum x)^2}{n} =$ $\frac{\sum (x-\bar{x})^2}{\sigma_0^2} =$ $\chi_{\alpha}^2(\nu) =$ $\chi_{1-\alpha}^2(\nu) =$ $\chi_{\alpha/2}^2(\nu) =$ $\chi_{1-\alpha/2}^2(\nu) =$

Results

Comparison of the population variance with the given value σ_0^2:

Two-sided case:

The hypothesis that the population variance is equal to the given value (null hypothesis) is rejected if:

$$\frac{\sum (x-\bar{x})^2}{\sigma_0^2} < \chi_{\alpha/2}^2(\nu) \quad or \quad \frac{\sum (x-\bar{x})^2}{\sigma_0^2} > \chi_{1-\alpha/2}^2(\nu)$$

One-sided cases:

a) The hypothesis that the population variance is not larger than the given value (null hypothesis) is rejected if:

$$\frac{\sum (x-\bar{x})^2}{\sigma_0^2} > \chi_{1-\alpha}^2(\nu)$$

b) The hypothesis that the population variance is not smaller than the given value (null hypothesis) is rejected if:

$$\frac{\sum (x-\bar{x})^2}{\sigma_0^2} < \chi_{\alpha}^2(\nu)$$

TABLE F - Estimation of a variance or of a standard deviation

Technical characteristics of the population studied:

Technical characteristics of the sample items:

Discarded observations:

Statistical data	**Calculations**
Sample size: $n=$	$\sum (x-\bar{x})^2 = \sum x^2 - \frac{(\sum x)^2}{n} =$
Sum of the observed values: $\sum x =$	$s^2 = \frac{\sum (x-\bar{x})^2}{n-1} =$
Sum of the squares of the observed values: $\sum x^2 =$	$\frac{\sum (x-\bar{x})^2}{\chi^2_{\alpha}(\nu)} =$
Degrees of freedom: $\nu=n-1$	$\frac{\sum (x-\bar{x})^2}{\chi^2_{1-\alpha}(\nu)} =$
Confidence level chosen: $1-\alpha =$	$\frac{\sum (x-\bar{x})^2}{\chi^2_{\alpha/2}(\nu)} =$
	$\frac{\sum (x-\bar{x})^2}{\chi^2_{1-\alpha/2}(\nu)} =$

Results

Estimation of the population variance σ^2:

$$(\sigma^2)^* = s^2 =$$

Two-sided confidence interval:

$$\frac{\sum (x-\bar{x})^2}{\chi^2_{1-\alpha/2}(\nu)} < \sigma^2 < \frac{\sum (x-\bar{x})^2}{\chi^2_{\alpha/2}(\nu)}$$

One-sided confidence intervals:

$$\sigma^2 < \frac{\sum (x-\bar{x})^2}{\chi^2_{\alpha}(\nu)}$$

or

$$\sigma^2 > \frac{\sum (x-\bar{x})^2}{\chi^2_{1-\alpha}(\nu)}$$

TABLE G – Comparison of two variances or of two standard deviations

Technical characteristics:	of population 1 of population 2		
Technical characteristics of the sample items taken:	in population 1 in population 2		
Discarded observations:	in sample 1 in sample 2		

Statistical data			**Calculations**
	First sample	Second sample	
Size:	$n_1=$	$n_2=$	$\sum (x_1 - \bar{x}_1)^2 = \sum x_1^2 - \frac{(\sum x_1)^2}{n_1} =$
Sum of the observed values:	$\sum x_1=$	$\sum x_2=$	$\sum (x_2 - \bar{x}_2)^2 = \sum x_2^2 - \frac{(\sum x_2)^2}{n_2} =$
Sum of the squares of the observe values:	$\sum x_1^2 =$	$\sum x_2^2 =$	$s_1^2 = \frac{\sum (x_1 - \bar{x}_1)^2}{n_1 - 1} =$
Degrees of freedom:	$\nu_1 = n_1 - 1$	$\nu_2 = n_2 - 1$	$s_2^2 = \frac{\sum (x_2 - \bar{x}_2)^2}{n_2 - 1} =$
Significance level chosen:			$F_{1-\alpha}(\nu_1, \nu_2) =$ $F_{1-\alpha/2}(\nu_1, \nu_2) =$
$\alpha =$			$\frac{1}{F_{1-\alpha}(\nu_2, \nu_1)} =$ $\frac{1}{F_{1-\alpha/2}(\nu_2, \nu_1)} =$

Results

Comparison of the population variances:

Two-sided case:

The hypothesis of the equality of the variances (null hypothesis) is rejected if:

$$\frac{s_1^2}{s_2^2} < \frac{1}{F_{1-\alpha/2}(\nu_2, \nu_1)} \quad or \quad \frac{s_1^2}{s_2^2} > F_{1-\alpha/2}(\nu_1, \nu_2)$$

One-sided cases:

a) The hypothesis that the first variance is not greater than the second (null hypothesis) is rejected if:

$$\frac{s_1^2}{s_2^2} > F_{1-\alpha}(\nu_1, \nu_2)$$

b) The hypothesis that the first variance is not smaller than the second (null hypothesis) is rejected if:

$$\frac{s_1^2}{s_2^2} < \frac{1}{F_{1-\alpha}(\nu_2, \nu_1)}$$

TABLE H – Estimation of the ratio of two variances or of two standard deviations

Technical characteristics: { of population 1 / of population 2

Technical characteristics of the sample items taken: { in population 1 / in population 2

Discarded observations: { in sample 1 / in sample 2

Statistical data

	First sample	Second sample
Size:	$n_1=$	$n_2=$
Sum of the observed values:	$\sum x_1=$	$\sum x_2=$
Sum of the squares of the observe values:	$\sum x_1^2 =$	$\sum x_2^2 =$
Degrees of freedom:	$\nu_1 = n_1 - 1$	$\nu_2 = n_2 - 1$

Confidence level chosen:

$1-\alpha =$

Calculations

$$\sum (x_1 - \bar{x}_1)^2 = \sum x_1^2 - \frac{(\sum x_1)^2}{n_1} =$$

$$\sum (x_2 - \bar{x}_2)^2 = \sum x_2^2 - \frac{(\sum x_2)^2}{n_2} =$$

$$s_1^2 = \frac{\sum (x_1 - \bar{x}_1)^2}{n_1 - 1} =$$

$$s_2^2 = \frac{\sum (x_2 - \bar{x}_2)^2}{n_2 - 1} =$$

$$F_{1-\alpha}(\nu_2, \nu_1)\frac{s_1^2}{s_2^2} = \qquad F_{1-\alpha/2}(\nu_2, \nu_1)\frac{s_1^2}{s_2^2} =$$

$$\frac{1}{F_{1-\alpha}(\nu_1, \nu_2)}\frac{s_1^2}{s_2^2} = \qquad \frac{1}{F_{1-\alpha/2}(\nu_1, \nu_2)}\frac{s_1^2}{s_2^2} =$$

Results

Estimation of the ratio of the two population variances σ_1^2 and σ_2^2:

$$\left(\frac{\sigma_1^2}{\sigma_2^2}\right)^* = \left(\frac{s_1^2}{s_2^2}\right) = \frac{\sum (x_1 - \bar{x}_1)^2 /(n_1 - 1)}{\sum (x_2 - \bar{x}_2)^2 /(n_2 - 1)}$$

Two-sided confidence interval:

$$\frac{1}{F_{1-\alpha/2}(\nu_1, \nu_2)}\frac{s_1^2}{s_2^2} < \frac{\sigma_1^2}{\sigma_2^2} < F_{1-\alpha/2}(\nu_2, \nu_1)\frac{s_1^2}{s_2^2}$$

One-sided confidence interval:

$$\frac{\sigma_1^2}{\sigma_2^2} < F_{1-\alpha}(\nu_2, \nu_1)\frac{s_1^2}{s_2^2} \quad or \quad \frac{\sigma_1^2}{\sigma_2^2} > \frac{1}{F_{1-\alpha}(\nu_1, \nu_2)}\frac{s_1^2}{s_2^2}$$