Test 4 Formulas mystatclass.com

Confidence interval for the population mean:

Case 1, when population standard deviation, σ, is known:

$$\bar{x} \pm z_{\alpha/2} \cdot \frac{\sigma}{\sqrt{n}}$$

See $z_{\alpha/2}$ values in a table below.

Case 2, when the sample standard deviation is given or it can be calculated:

$$\bar{x} \pm t_{\alpha/2} \cdot \frac{s}{\sqrt{n}}$$

For critical values $t_{\alpha/2}$ use $t - distribution\ table$.

Confidence interval for one proportion:

$$\hat{p} \pm z_{\alpha/2} \cdot \sqrt{\frac{\hat{p} \cdot \hat{q}}{n}}$$

Critical values: $z_{\alpha/2}$

CI	$Z_{\alpha/2}$
80%	1.282
81%	1.311
82%	1.341
83%	1.372
84%	1.405
85%	1.440
86%	1.476
87%	1.514
88%	1.555
89%	1.598
90%	1.645
91%	1.695
92%	1.751
93%	1.812
94%	1.881
95%	1.960
96%	2.054
97%	2.170
98%	2.326
99%	2.576

Formula for estimating the sample size of the population's proportion to be taken:

$$n = \hat{p} \cdot \hat{q} \left(\frac{Z_{\alpha/2}}{E}\right)^2$$

E: percentage error as a decimal

Hypothesis Testing:

1. Testing a hypothesis about a population mean, sigma –population standard deviation known:

   Test Statistics: $Z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}}$

2. Testing a hypothesis about a population mean, sample standard deviation known:

   Test Statistics: $t = \frac{\bar{x} - \mu}{s/\sqrt{n}}$

3. Testing a hypothesis about a population proportion:

   Test Statistics: $Z = \frac{\hat{p} - p}{\sqrt{\frac{p \cdot q}{n}}}$