

## Sample Size Formulas

You can find the following formulae (or variations thereof) in most statistics textbooks, especially descriptive statistics dealing with probability.

**Sample Size - Infinite Population** (where the population is greater than 50,000)

$$SS = \frac{Z^2 \times (p) \times (1 - p)}{C^2}$$

SS = Sample Size

Z = Z-value<sup>A</sup> (e.g., 1.96 for a 95 percent confidence level)

P = Percentage of population picking a choice, expressed as decimal<sup>B</sup>

C = Confidence interval, expressed as decimal (e.g., .04 = +/- 4 percentage points)

A Z-values (Cumulative Normal Probability Table) represent the probability that a sample will fall within a certain distribution.

The Z-values for confidence levels are:

1.645 = 90 percent confidence level

1.96 = 95 percent confidence level

2.576 = 99 percent confidence level

Example:

$$SS = \frac{3.8416 \times .5 \times .5}{.0016}$$

$$SS = 600$$

**Sample Size – Finite Population** (where the population is less than 50,000)

$$\text{New SS} = \frac{SS}{\left(1 + \left(\frac{SS - 1}{\text{Pop}}\right)\right)}$$

Pop = Population (e.g., 4,300)

*Note: Calculate the sample size using the infinite population formula first. Then use the sample size derived from that calculation to calculate a sample size for a finite population.*

Example:

$$\text{New SS} = \frac{600}{\left(1 + \left(\frac{600 - 1}{4300}\right)\right)} \quad \text{New SS} = 527$$