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 (e.g., 1.96 for a 95 percent confidence level)
P = Percentage of population picking a choice, expressed as decimal
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)

\[
\text{New SS} = \frac{SS}{1 + ( SS - 1 \frac{1}{Pop})}
\]

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:

\[
\text{New SS} = \frac{600}{1 + (600 - 1 \frac{1}{4300})}
\]

New SS = 527