# Sample size calculator

In this reading, you will learn the basics of sample size calculators, how to use them, and how to understand the results. A sample size calculator tells you how many people you need to interview (or things you need to test) to get results that represent the target population. Let’s review some terms you will come across when using a sample size calculator:

* Confidence level: The probability that your sample size accurately reflects the greater population.
* Margin of error: The maximum amount that the sample results are expected to differ from those of the actual population.
* Population: This is the total number you hope to pull your sample from.
* Sample: A part of a population that is representative of the population.
* Estimated response rate: If you are running a survey of individuals, this is the percentage of people you expect will complete your survey out of those who received the survey.

## How to use a sample size calculator

In order to use a sample size calculator, you need to have the population size, confidence level, and the acceptable margin of error already decided so you can input them into the tool. If this information is ready to go, check out these sample size calculators below:

* [Sample size calculator by surveymonkey.com](https://www.surveymonkey.com/mp/sample-size-calculator/)
* [Sample size calculator by raosoft.com](http://www.raosoft.com/samplesize.html)

## What to do with the results

After you have plugged your information into one of these calculators, it will give you a recommended sample size. Keep in mind, the calculated sample size is the minimum number to achieve what you input for confidence level and margin of error. If you are working with a survey, you will also need to think about the estimated response rate to figure out how many surveys you will need to send out. For example, if you need a sample size of 100 individuals and your estimated response rate is 10%, you will need to send your survey to 1,000 individuals to get the 100 responses you need for your analysis.

Now that you have the basics, try some calculations using the sample size calculators and refer back to this reading if you need a refresher on the definitions.

### Worked Example

If a retailer would like to estimate the proportion of their customers who bought an item after viewing their website on a certain day with a 95% confidence level and 5% margin of error, how many customers do they have to monitor? Given that their website has on average 10,000 views per day and they are uncertain of their current conversion rate, then they would need to sample 370 customers. If, however they know from previous studies that they would expect a conversion rate of 5%, then a sample size of 73 would be sufficient.

### Formula

This calculator uses the following formula for the sample size n:

n = N\*X / (X + N – 1),

where,

X = Zα/22 ­\*p\*(1-p) / MOE2,

and Zα/2 is the critical value of the Normal distribution at α/2 (e.g. for a confidence level of 95%, α is 0.05 and the critical value is 1.96), MOE is the margin of error, p is the sample proportion, and N is the population size. Note that a Finite Population Correction has been applied to the sample size formula.

### Definitions

#### Margin of error

The margin of error is the the level of precision you require. This is the plus or minus number that is often reported with an estimated proportion and is also called the confidence interval. It is the range in which the true population proportion is estimated to be and is often expressed in percentage points (e.g., ±2%). Note that the actual precision achieved after you collect your data will be more or less than this target amount, because it will be based on the proportion estimated from the data and not your expected sample proportion.