

How many responses do you really need? This simple question is a never-ending quandary for researchers. A larger sample can yield more accurate results — but excessive responses can be pricey.

Consequential research requires an understanding of the statistics that drive sample size decisions. A simple equation will help you put the migraine pills away and sample confidently.

Before you can calculate a sample size, you need to determine a few things about the target population and the sample you need:

1. **Population Size** — How many total people fit your demographic? For instance, if you want to know about mothers living in the US, your population size would be the total number of mothers living in the US. Don't worry if you are unsure about this number. It is common for the population to be unknown or approximated.
2. **Margin of Error (Confidence Interval)** — No sample will be perfect, so you need to decide how much error to allow. The confidence interval determines how much higher or lower than the population mean you are willing to let your sample mean fall. If you've ever seen a political poll on the news, you've seen a confidence interval. It will look something like this: "68% of voters said yes to Proposition Z, with a margin of error of +/- 5%."
3. **Confidence Level** — How confident do you want to be that the actual mean falls within your confidence interval? The most common confidence intervals are 90% confident, 95% confident, and 99% confident.
4. **Standard of Deviation** — How much variance do you expect in your responses? Since we haven't actually administered our survey yet, the safe decision is to use .5 — this is the most forgiving number and ensures that

your sample will be large enough.

Okay, now that we have these values defined, we can **calculate our needed sample size**.

Your confidence level corresponds to a Z-score. This is a constant value needed for this equation. Here are the z-scores for the most common confidence levels:

- 90% – Z Score = 1.645
- 95% – Z Score = 1.96
- 99% – Z Score = 2.576

If you choose a different confidence level, use this [Z-score table](#)* to find your score.

Next, plug in your Z-score, Standard of Deviation, and confidence interval into this equation:**

$$\text{Necessary Sample Size} = \frac{(Z\text{-score})^2 * \text{StdDev} * (1 - \text{StdDev})}{(\text{margin of error})^2}$$

Here is how the math works assuming you chose a 95% confidence level, .5 standard deviation, and a margin of error (confidence interval) of +/- 5%.

$$\begin{aligned} & ((1.96)^2 \times .5(.5)) / (.05)^2 \\ & (3.8416 \times .25) / .0025 \\ & .9604 / .0025 \\ & 384.16 \\ & 385 \text{ respondents are needed} \end{aligned}$$

Voila!

You've just determined your *sample size*.