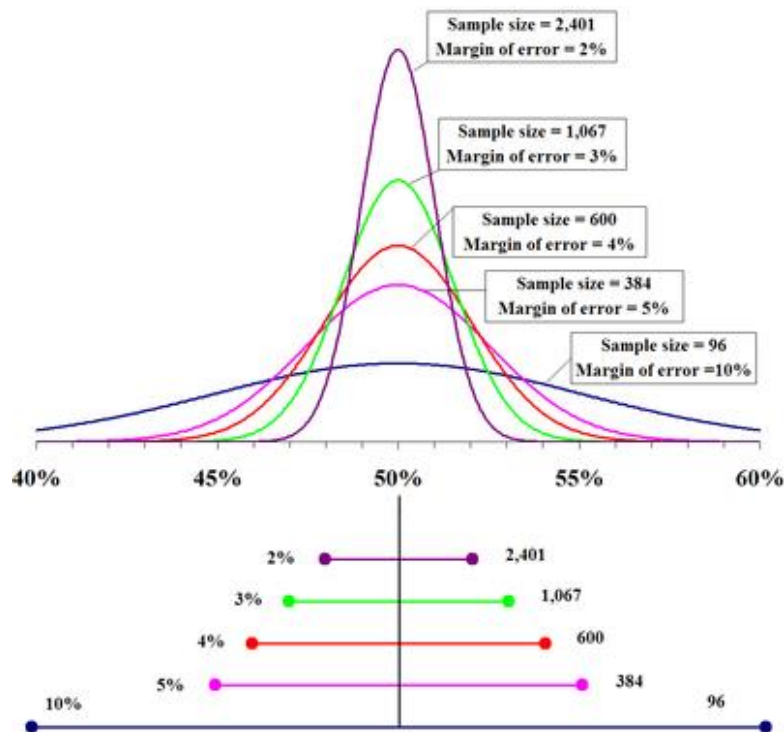


MARGIN OF ERROR IN EXCEL – DEMO NOTES

Pollsters tend to report results with a “margin of error” that is assumed to be within 2-3%. What does this number mean, and why is it assumed to be 2-3%?

The margin of error is the range within which we expect to find our true population. Here is a good visualization [from Wikipedia](#). Notice the relationship between sample size and margin of error:



Our equation for the margin of error is

$$\text{Margin of error} = Z * \frac{\sigma}{\sqrt{n}}$$

Where

Z = critical value

σ = standard deviation

n = sample size

$\frac{\sigma}{\sqrt{n}}$ = standard error



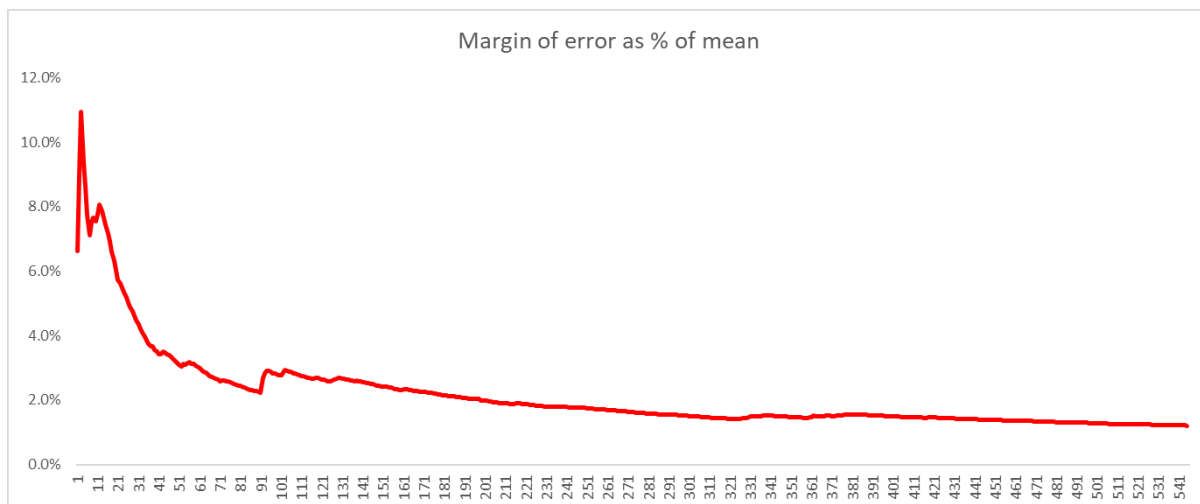
For the demonstration, fill out the below columns of the start worksheet using these formulas.

We will take a running mean and standard deviation of our samples, then compute the margin of error given using the above formula. This is for a two-tailed test at the 95% confidence interval.

Demo file: [margin-of-error.xlsx](#)

| Column position | Column label | Formula |
|-----------------|------------------------------|-------------------------------------|
| C | Sample mean | =AVERAGE(\$B\$7:B8) |
| D | Standard deviation | =STDEV.S(\$B\$7:C8) |
| E | Standard Error | =D8/SQRT(A8) |
| F | Critical value | =VLOOKUP(A8,critical_values,2,TRUE) |
| G | Margin of error | =F8*E8 |
| H | Margin of error as % of mean | =G8/C8/2 |

By default, Column H will be plotted as a line chart expressing the margin of error as a percent of the mean:



This expresses the amount of sampling error there is in the sample mean being reflective of the population. The margin of error dips significantly around $n=30$, $n=60$ and $n=100$. These are empirical results but are generally good rules of thumb as “good, better, best” sample sizes for conducting inferential statistics.

