

SAMPLE SIZE When conducting a survey, you need to make the size of your sample large enough so that it accurately represents the population. As the sample size increases, the *margin of error* decreases.

The **margin of error** gives a limit on how much the responses of the sample would differ from the responses of the population. For example, if 40% of the people in a poll prefer candidate A, and the margin of error is $\pm 4\%$, then it is likely that between 36% and 44% of the entire population prefer candidate A.

KEY CONCEPT

For Your Notebook

Margin of Error Formula

When a random sample of size n is taken from a large population, the margin of error is approximated by this formula:

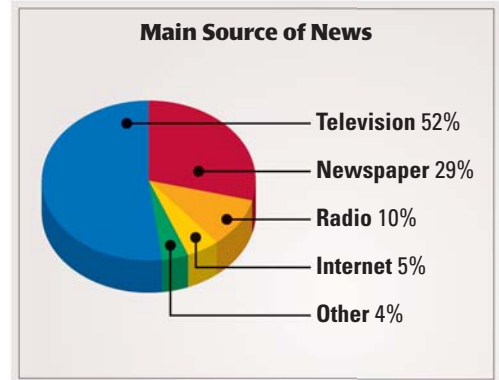
$$\text{Margin of error} = \pm \frac{1}{\sqrt{n}}$$

This means that if the percent of the sample responding a certain way is p (expressed as a decimal), then the percent of the population that would respond the same way is likely to be between $p - \frac{1}{\sqrt{n}}$ and $p + \frac{1}{\sqrt{n}}$.

EXAMPLE 4 Find a margin of error

MEDIA SURVEY In a survey of 1011 people, 52% said that television is their main source of news.

- What is the margin of error for the survey?
- Give an interval that is likely to contain the exact percent of all people who use television as their main source of news.



Solution

- Use the margin of error formula.

$$\text{Margin of error} = \pm \frac{1}{\sqrt{n}}$$

Write margin of error formula.

$$= \pm \frac{1}{\sqrt{1011}}$$

Substitute 1011 for n .

$$\approx \pm 0.031$$

Use a calculator.

- The margin of error for the survey is about $\pm 3.1\%$.
- To find the interval, subtract and add 3.1% to the percent of people surveyed who said television is their main source of news (52%).

$$52\% - 3.1\% = 48.9\%$$

$$52\% + 3.1\% = 55.1\%$$

- It is likely that the exact percent of all people who use television as their main source of news is between 48.9% and 55.1%.