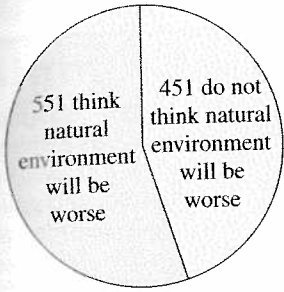


PICTURING the WORLD

A poll surveyed 1002 adults in the United States about the environment. Of those surveyed, 551 said that in 10 years or so, they think the natural environment in the world will be worse than it is today. (Adapted from PollingReport.com)



Find a 90% confidence interval for the proportion of adults in the United States that think the natural environment will be worse.

Study Tip

Here are instructions for constructing a confidence interval for a population proportion on a TI-83/84.

STAT

Choose the TESTS menu.

A: 1-PropZInt

Enter the values for x , n , and the level of confidence c (C-Level). Then select **Calculate**.



► Confidence Intervals for a Population Proportion p

Constructing a confidence interval for a population proportion p is similar to constructing a confidence interval for a population mean. You start with a point estimate and calculate a margin of error.

DEFINITION

A c -confidence interval for the population proportion p is

$$\hat{p} - E < p < \hat{p} + E$$

where

$$E = z_c \sqrt{\frac{\hat{p}\hat{q}}{n}}$$

The probability that the confidence interval contains p is c .

In Section 5.5, you learned that a binomial distribution can be approximated by the normal distribution if $np \geq 5$ and $nq \geq 5$. When $n\hat{p} \geq 5$ and $n\hat{q} \geq 5$, the sampling distribution for \hat{p} is approximately normal with a mean of

$$\mu_{\hat{p}} = p$$

and a standard error of

$$\sigma_{\hat{p}} = \sqrt{\frac{pq}{n}}$$

GUIDELINES

Constructing a Confidence Interval for a Population Proportion

In Words

1. Identify the sample statistics n and x .
2. Find the point estimate \hat{p} .
3. Verify that the sampling distribution of \hat{p} can be approximated by the normal distribution.
4. Find the critical value z_c that corresponds to the given level of confidence c .
5. Find the margin of error E .
6. Find the left and right endpoints and form the confidence interval.

In Symbols

$$\hat{p} = \frac{x}{n}$$

$$n\hat{p} \geq 5, n\hat{q} \geq 5$$

Use the Standard Normal Table.

$$E = z_c \sqrt{\frac{\hat{p}\hat{q}}{n}}$$

Left endpoint:

$$\hat{p} - E$$

Right endpoint:

$$\hat{p} + E$$

Interval:

$$\hat{p} - E < p < \hat{p} + E$$