

6

EXAMPLE

A poll carried out by a newspaper indicated that 48% of the voting population would support a candidate in a presidential election. Three weeks later, a rival newspaper surveyed 1,800 voters and 918 said they would support the candidate. Investigate at the 5% level of significance whether support for the candidate changed.

Solution

1. State H_0 and H_A .

H_0 : The support for the candidate has remained at 48%. $\mu = 48\%$ $p = 0.48$

H_A : The support for the candidate is not at 48%. $\mu \neq 48\%$, i.e. the support has changed. $p \neq 0.48$

2. Sample proportion $\hat{p} = \frac{918}{1,800} = 0.51$

3. 95% margin of error = $E = 1.96\sigma_{\hat{p}} = 1.96\sqrt{\frac{\hat{p}(1-\hat{p})}{n}} = 1.96\sqrt{\frac{(0.51)(0.49)}{1,800}}$

$$E = 0.023 (= 2.3\%)$$

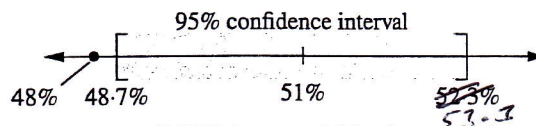
4. Confidence interval

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

$$0.51 - 0.023 \leq p \leq 0.51 + 0.023$$

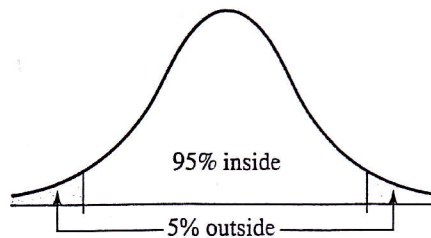
$$0.487 \leq p \leq 0.533$$

$$48.7\% \leq p \leq 53.3\%$$



5. The claimed voter support of 48% is not within the confidence interval, so we reject the null hypothesis, H_0 .
6. We conclude that voter support has changed.

Note: When working with the terms *levels of significance* or *levels of confidence*, statisticians use percentages ambiguously. In particular, the 5% level of significance and the 95% level of confidence refer to the same region.



Note:

If inside 48.7% \rightarrow 53.3%
then "Fail to reject"