

Worksheet: Confidence Intervals for Proportions

1. The paralyzed Veterans of America is a philanthropic organization that relies on contributions. They send free mailing labels and greeting cards to potential donors on their list and ask for voluntary contribution. To test a new campaign they recently sent letters to a random sample of 100,000 potential donors and received 4781 donations.
 - a) Give a 95% confidence interval for the true proportion of those from their entire mailing list who may donate.
 - b) A staff member thinks that the true rate is 5%. Given the confidence interval you found, do you find that percentage plausible?

2. A national health organization warns that 30% of the middle school students nationwide have been drunk. Concerned, a local health agency randomly and anonymously surveys 110 of the middle 1212 middle school students in its city. Only 21 of them report having been drunk.
 - a) What proportion of the sample reported having been drunk?
 - b) Does this mean that this city's youth are not drinking as much as the national data would indicate?
 - c) Create a 95% confidence interval for the proportion of the city's middle school students who have been drunk.
 - d) Is there any reason to believe that the national level of 30% is not true of the middle school students in the city?
 - e) To keep the margin of error at most 5%, how many middle school students do we need to survey?

3. In a poll taken in March of 2007, Gallup asked 1006 national adults whether they were baseball fans. 36% said they were. A year previously 37% of a smaller size sample had reported being baseball fans.
 - a) Find the margin of error for the 2007 poll if we want 90% confidence in our estimate of the percent of national adults who are baseball fans.
 - b) Explain what the margin of error means.

 - c) If we wanted to be 99% confident, would the margin of error be larger or smaller?
 - d) Find the margin of error for 99% confidence level.

- e) In general, all other aspects of the situation remain the same; will smaller margins of error produce greater or less confidence in the interval?
- f) Do you think there's been a change from 2006 to 2007 in the real proportion of national adults who are baseball fans?

4. Several factors are involved in the creation of a confidence interval. Among them are the sample size, the level of confidence, and the margin of error. Which statements are true?
- a) For a given sample size, higher confidence means a smaller margin of error.
 - b) For a specified confidence level, larger samples provide smaller margins of error.
 - c) For a fixed margin of error, larger samples provide a greater confidence.
 - d) For a given confidence level, halving the margin of error requires a sample twice as large.
 - e) For a given sample size reducing the margin of error will mean lower confidence.
 - f) For a certain confidence level, you can get a smaller margin of error by selecting a bigger sample.
 - g) For a fixed margin of error, smaller samples will mean lower confidence.
 - h) For a given confidence level, a sample 9 times as large will make a margin of error one third as big.