

Practice Questions for Sampling Proportions

Example problems

Key

A law school wants to know how successful its graduates are at passing the bar exam on the first try. Two hundred graduates are randomly selected and asked whether they passed the bar exam the first time they took it. Of the 200 graduates, 130 said they passed the exam on the first try.

1. What is the proportion of graduates that passed the exam on the first try? $\frac{130}{200} = \hat{p}$
 $.65$
2. What is the sample size (n)? 200
3. What is the standard error? .0337 $= \sigma_{\hat{p}}$ Use the formula $\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$
4. Set a 95 % confidence interval for the proportion of law student graduates at this university who passed the bar exam.
 $.65 \pm 1.96 \cdot .0337$ $(.5839, .716)$ or $(.584, .716)$
5. Interpret the interval in the context of the problem.

✓ We are 95% confident that the true population proportion of law students who took the bar exam and passed on the first try is between .58 & .72

Consider the law school's study of the proportion of its graduates who pass the bar exam on the first try. Earlier, we had a sample of 200 and set a 95% confidence interval on the proportion of students who passed the bar exam on the first try.

6. Set a 99% confidence interval for the population proportion of graduates who pass the bar exam on the first try.
 $.65 \pm 2.575 \cdot .0337$ $(.5632, .7368)$
7. Suppose that only 100 graduates were sampled and 65 reported passing the bar exam on the first try. (Note that the estimated proportion is the same for both samples.) Set a 99% confidence interval on the proportion of the school's graduates who pass the bar exam the first time. Compare the intervals.

same $.65 \pm 2.575 \cdot .0477$ $(.5272, .7728)$

much wider margin of error / C.I.
b/c of the smaller sample size
which makes a larger st. error.

1. In October 1992, ownership of the San Francisco Giants baseball team considered a sale of the franchise that would lead to a move to Florida. A random sample of 610 San Francisco Bay Area taxpayers, carried out by the *San Francisco Examiner*, contained 50.7% who would be disappointed by this move. Find a 99% confidence interval for the population proportion of Bay Area taxpayers with this feeling.

$$.507 \pm 2.575 \cdot \sqrt{\frac{.507(1-.507)}{610}} \quad (.4549, .559)$$

2. A random sample was taken of 189 National Basketball Association games in which the score was not tied after one quarter. In 132 of these games, the team leading after one quarter won the game.

(a) Find a 90% confidence interval for the population proportion of all occasions on which the team leading after one quarter wins the game and state what this means.

$$.698 \pm 1.645 \cdot \sqrt{\frac{.698(1-.698)}{189}} \quad (.6431, .7529)$$

(b) Without doing the calculations, state whether a 95% confidence interval for the population proportion would be wider than or narrower than that found in (a).

~~broader~~ narrower

3. A random sample was taken of 96 foreign manufacturers, with direct investment in the United States, who use independent U.S. industrial distributors. Of these sample members, 32 said the distributors were rarely or never capable of performing the advice and technical support function. Find an 80% confidence interval for the population proportion.

$$.33 \pm 1.28 \cdot \sqrt{\frac{.33(1-.33)}{96}} \quad (.2686, .3914)$$

4. In a random sample of 1,158 newly promoted executives, 47.9% rated a statistics course as very important or somewhat important as part of the preparation for a career in general management. Find a 99% confidence interval for the population proportion of all newly promoted executives holding this view.

$$.479 \pm 2.575 \cdot \sqrt{\frac{.479(.521)}{1158}} \quad (.4412, .5168)$$

5. A company contemplating the introduction of a new product wants to estimate the percentage of the market that this new product might capture. In a survey, random samples of 100 customers were asked whether or not they would purchase this new product. Fourteen responded affirmatively. Calculate the 95% confidence interval for the population proportion of potential customers that would purchase the new product. Interpret the result.

$$.14 \pm 1.96 \cdot \sqrt{\frac{.14(.86)}{100}} \quad (.0720, .2080)$$

6. A random sample of 100 preschool children in Ola revealed that only 60 had been vaccinated. Provide an approximate 95% confidence interval for the proportion vaccinated in that suburb.

$$.60 \pm 1.96 \cdot \sqrt{\frac{.60(1-.40)}{100}} \quad (.5040, .6960)$$

I am 95% confident that the true pop. proportion of potential customers that would purchase the new product is between .0720 & .2080