

14: Random Samples --- Answers

1. A population is the entire group you want to know something about. A sample is a portion of the population that you use to collect data.
2. A parameter is a number calculated on the basis of the entire population. A statistic is a number calculated from a sample.
3. It means that this estimate of all those in the state that favor a ban on gambling casinos is somewhere between 59% and 65%.
4. This is the formula used to determine the confidence interval for a population proportion. The n represents the size of the sample, \hat{p} represents the sample proportion, and z represents the z -score, which is a measure of the confidence level. For example, if $z = 1.96$, this would give a 95% confidence level. If $z = 2.576$, this would give a 99% confidence level. The larger z is, the higher the confidence level.
5.
 - a) 0.674 to 0.796
 - b) The margin of error is the 0.61 or 6.1%.
6.
 - a) Because that part of the formula represents the margin of error.
$$0.03 = 1.96\sqrt{\frac{0.5(0.5)}{n}}$$
$$0.03 = \frac{1.96\sqrt{0.25}}{\sqrt{n}}$$
 - b)
$$\sqrt{n} = \frac{1.96\sqrt{0.25}}{0.03}$$
$$n = \left(\frac{1.96\sqrt{0.25}}{0.03}\right)^2$$
 - c) Fractions don't make sense as a sample size, so round to the nearest integer.
7. In a stratified random sample, you first divide the population into groups, and then pick simple random samples from each of the groups.
8. You have low variability. You can't tell about the bias.
9. The main thing is to try and collect a simple random sample. In other words, each member of the population should be as likely as any other member to be selected. In surveys, be sure to word your questions as carefully as possible to avoid bias.
10. Use as large as sample size as is feasible.
11. They mainly polled those who had telephones or automobiles. Since many people at that time did not have either, this sample was not representative of the whole population.
12. She used very long surveys which only a very motivated person would fill out. She only sent surveys to members of particular women's groups. The people who responded self-selected themselves for the survey, so the sample was not random.
13. A person could call any number of times. It also might be biased depending on how the phone numbers are advertised (are they being shown on the Rush Limbaugh show or during the CBS Evening News.)
14.
 - a) $59 \pm 5\%$ or from 54% to 64%.
 - b) About 2323 people would suffice.