

Week Seven Homework Solutions

8.3 A Population Proportion

HOMEWORK #125, 126, 127, 128, 132 A (Interpret)& C, 133

Use the following information to answer the next three exercises: According to a Field Poll, 79% of California adults (actual results are 400 out of 506 surveyed) feel that “education and our schools” is one of the top issues facing California. We wish to construct a 90% confidence interval for the true proportion of California adults who feel that education and the schools is one of the top issues facing California.

125. A point estimate for the true population proportion is:

- a. 0.90
- b. 1.27
- c. 0.79**
- d. 400

The point estimate of p is the 79% mentioned, or $\hat{p} = \frac{400}{506} = .79$.

126. A 90% confidence interval for the population proportion is _____.

- a. (0.761, 0.820)**
- b. (0.125, 0.188)
- c. (0.755, 0.826)
- d. (0.130, 0.183)

Now we can combine the LB and UB to get the 90% confidence interval:

$$\pi \in (0.7607, 0.8203)$$

127. The error bound is approximately _____.

- a. 1.581
- b. 0.791
- c. 0.059
- d. 0.030**

Error Bound is Margin of Error = .8203 - .79 = 0.0303

Five hundred and eleven (511) homes in a certain southern California community are randomly surveyed to determine if they meet minimal earthquake preparedness recommendations. One hundred seventy-three (173) of the homes surveyed met the minimum recommendations for earthquake preparedness, and 338 did not.

Now we can combine the LB and UB to get the 90% confidence interval:

$$\pi \in (0.3042, 0.373)$$

128.

Find the confidence interval at the 90% Confidence Level for the true population proportion of southern California community homes meeting at least the minimum recommendations for earthquake preparedness.

- a. (0.2975, 0.3796)
- b. (0.6270, 0.6959)
- c. (0.3041, 0.3730)**
- d. (0.6204, 0.7025)

132.

Public Policy Polling recently conducted a survey asking adults across the U.S. about music preferences. When asked, 80 of the 571 participants admitted that they have illegally downloaded music.

- a. Create a 99% confidence interval for the true proportion of American adults who have illegally downloaded music.

Now we can combine the LB and UB to get the 99% confidence interval:

$$\pi \in (0.1027, 0.1775)$$

INTERPRET: We are 99% confident that the true proportion of American adults who have illegally downloaded music is between .10 and .18.

- ~~b. This survey was conducted through automated telephone interviews on May 6 and 7, 2013. The error bound of the survey compensates for sampling error, or natural variability among samples. List some factors that could affect the survey's outcome that are not covered by the margin of error.~~
- c. Without performing any calculations, describe how the confidence interval would change if the confidence level changed from 99% to 90%.

The confidence interval would get narrower since the Z_{crit} would decrease for 90% confidence and this would make the margin of error also decrease.

133.

You plan to conduct a survey on your college campus to learn about the political awareness of students. You want to estimate the true proportion of college students on your campus who voted in the 2012 presidential election with 95% confidence and a margin of error no greater than five percent. How many students must you interview?

$$n = (.50)(1 - .50) \left(\frac{1.96}{.05} \right)^2 = 384.16$$

We should interview at least 385 students.