

Ch8 Homework

1. In a simple random sample 30 out of 150 Bay Area graduate students make less than \$50,000 on their entry level jobs.
 - a) Construct a 95% confident interval (CI) to estimate the percentage of all Bay Area graduate students making less than \$50,000 on their entry level jobs. Find the margin of error, the CI, and interpret the CI.
 - b) A newspaper claims that more than 20% of Bay Area graduate students making less than \$50,000 on their entry level jobs. Does the CI support this claim? Explain.
 - c) Write out an appropriate claim based on the CI.

2. A simple random sample of 200 Bay Area residents reveals that 60% of them wanted to move out of the region because of ridiculous rise in housing and food prices.
 - a) How many Bay Area residents wanted to move out of the region because of ridiculous rise in housing and food prices?
 - b) Estimate the percent of all Bay Area residents wanted to move out of the region because of ridiculous rise in housing and food prices. Find the margin of error, the CI, and interpret the CI.
 - c) If you want the estimation to be within 3% of the true population proportion, how many Bay Area residents must you survey?

3. Assume you are working for a Costco Inc. Your boss asks you to redo the inventory on organic milk to better serve customers' demand. Your task is to determine the percentage of adults who drink organic milk daily. Assume that nothing is known about the percentage of adults who drink organic milk daily. How many adults must you survey in order to be 95% confident that your estimation is within 5% of the true population proportion?

4. A recent survey of 50 Bay Area drivers on the number of miles they drive each week results in a mean of 600 and a standard deviation of 190.
 - a) Construct a 90% confident interval and interpret the answer.
 - b) Construct a 99% confident interval and interpret the answer.
 - c) Which confidence interval is wider? Why?

5. One hundred Bay Area residents were surveyed to determine the number of hours they spend watching television each month. It was revealed that they watched an average of 151 hours each month with a standard deviation of 32 hours.
 - a) Construct a 95% confidence interval for the population mean hours spent watching television per month. Approximate the lower limit and upper limit of the confident interval to the nearest integers, then interpret the CI.
 - b) If you want the estimation to be within 5 hours of the true population mean, how many Bay Area residents must you survey?

1 a **95% confidence interval results:**

Proportion	Count	Total	Sample Prop.	Std. Err.	L. Limit	U. Limit
p	30	150	0.2	0.032659863	0.13598784	0.26401216

$$E = (0.264 - 0.136) / 2 = 0.064 \quad CI = [0.136, 0.264]$$

b $CI = [0.136, 0.264]$ $[0.136, 0.2]$ not concluded so it's wrong

c "At the 95% confidence level, between 13.6% and 26.4% of Bay Area graduate students earn less than \$50 000

2 a $0.6 * 200 = 120$

b **95% confidence interval results:**

Proportion	Count	Total	Sample Prop.	Std. Err.	L. Limit	U. Limit
p	120	200	0.6	0.034641016	0.53210486	0.66789514

$$E = (0.668 - 0.532) / 2 = 0.068 \quad CI = [0.035, 0.532]$$

$$c \quad n = [(1.96)^2 * 0.6 * 0.4] / 0.03^2 = 1024.4 = 1025$$

$$3 \text{ default } p = 0.5 \quad (1.96^2 * 0.5 * 0.5) / 0.05^2 = 384.16 = 385$$

4 a **90% confidence interval results:**

Mean	Sample Mean	Std. Err.	DF	L. Limit	U. Limit
μ	600	26.870058	49	554.95098	645.04902

$$[555, 645]$$

b **99% confidence interval results:**

Mean	Sample Mean	Std. Err.	DF	L. Limit	U. Limit
μ	600	26.870058	49	527.98954	672.01046

$$[528, 672]$$

c 99% one is wider, it requires larger sample

5 a **95% confidence interval results:**

Mean	Sample Mean	Std. Err.	DF	L. Limit	U. Limit
μ	151	3.2	99	144.65051	157.34949

$$[145, 157]$$

$$b \quad n = (1.96 * 32/5)^2 = 157.4 = 158$$