

STAT 2290 Homework 6

Hand in on April 15 or 16 with or before your exam.

Read these instructions:

- Show your work. Answers without proper justifications receive no credit.

Problem 1.

In a recent National Survey of Drug Use and Health, 2312 of 5914 randomly selected full-time U.S. college students were classified as binge drinkers.

- Calculate and interpret a 99% confidence interval for the population proportion p that are binge drinkers.
- A newspaper article claims that 45% of full-time U.S. college students are binge drinkers. Use your result from part (a) to comment on this claim.

Problem 2.

PTC is a substance that has a strong bitter taste for some people and is tasteless for others. The ability to taste PTC is inherited. About 75% of Italians can taste PTC, for example. You want to estimate the proportion of Americans who have at least one Italian grandparent and who can taste PTC.

- How large a sample must you test to estimate the proportion of PTC tasters within 0.04 with 90% confidence? Answer this question using the 75% estimate as the guessed value for \hat{p} .
- Answer the question in part (a) again, but this time use the conservative guess $\hat{p} = 0.5$. By how much do the two sample sizes differ?

Problem 3.

A group of researchers calculates the mean quantity of sodium (in milligrams) in selected branded cereals consumed by people in each serving. To do so, the group takes a random sample of 30 branded cereals and obtain the quantity (in milligrams) below.

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130 15 260 140 200 180 125 210 200 210 220 290 210 140 180
280 290 90 180 140 80 220 140 190 125 200 0 160 240 135
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From past studies, the research council assumes that σ is 70.7 milligrams. Construct a 99% confidence intervals for the population mean.

Problem 4.

A soccer ball manufacturer wants to estimate the mean circumference of soccer balls within 0.15 inch. Determine the minimum sample size required to construct a 99% confidence interval for the population mean. Assume the population standard deviation is 0.5 inch.