

**Lab Assignment #22**

This lab is due at 9:35 AM on Wednesday, 4/24 and is worth 6 points. This may be done individually, or in a group of 2 or 3 people.

Write a 1-sentence summary for each problem.

1) Suppose that 18% of all customers at Mike's at the Crossroads, in Cotati, CA, order their cheeseburger with no cheese. If 300 people come to the restaurant, what is the probability that less than 14% of cheeseburgers are ordered with no cheese?

2) Forty-two percent of all adults between 50 and 59 years old can correctly identify the book or movie containing the character Zaphod Beeblebrox. In a sample of 600 adults age 50 to 59, what is the probability that more than 39% can identify the book or movie?

3) In the 2010 US Census, it was found that 58.7% of adults living in Iowa are married. If 150 Iowa adults were chosen randomly in 2010, what is the probability that between 50% and 60% were married?

4) Suppose that 27% of religious people choose to celebrate their favorite spring religious holiday by eating a Palmer chocolate bunny.

a) If 200 religious people are chosen, what is the probability that between 24% and 30% of this sample celebrate their favorite spring religious holiday by eating a Palmer chocolate bunny?

b) If 2000 religious people are chosen, what is the probability that between 24% and 30% of this sample celebrate their favorite spring religious holiday by eating a Palmer chocolate bunny?

c) Explain why the answer to (b) is greater than the answer to (a).

5) A survey of visitors to the 2023 Whole Earth Festival on the UC Davis campus shows that 233 out of 600 visitors live in Davis or on the UC Davis campus. Find a 99% confidence interval for the fraction of all 2022 WEF visitors who live in Davis or on campus.

6) A small study shows that 299 out of 802 people believe that hamsters are better pets than guinea pigs.

a) What would be the margin of error for a 95% confidence interval?

b) How many more people should you survey to reduce the margin of error in part (a) down to 2 percentage points?

7) Find a 90% confidence interval for the fraction of adult Americans who watch The Continuous Creation Theory, given that 292 out of 2,023 people surveyed respond that they watch TCCT.

8) In a political poll of 30 likely voters, 18 say they are planning to vote Yes on Measure 27, which would mandate teaching statistics to all 4th-graders.

a) Find a 99% confidence interval for the fraction of all likely voters who plan to vote Yes on 27.

b) Notice that the CI goes from below 50% to above 50%. I mean, way below to way above. This means that we can't predict, from this poll alone, whether Measure 27 will pass.

c) The sample proportion was 60%, right? That seems a lot higher than 50%, right? But it wasn't nearly enough to predict the election.

d) So even if 60% of a survey of 30 say yes, that does not prove that the majority of all people says yes. Right?

e) What does this say, in general, about sample sizes for qualitative variable questions?

f) Your favorite sports team wins 18 out of their first 30 games. Can you say with confidence that they are a better than average team? Or maybe they just got lucky?