Chapter 20: Hypothesis Testing for a Population Proportion - *p*

1. Recent data showed that 66% of the tens of thousands of applicants to a certain program were accepted. A company that trains applicants claimed that 151 of their 220 students it trained that year were accepted. Assume that these trainees were representative of the population of applicants. Has the company demonstrated a real improvement over the average?

1. Write out the appropriate hypotheses
2. Find the p-value
3. Explain in words what the p-value means
4. State your conclusion (answer the question in context)

2. According to the Centers for Disease Control and Prevention, 60% of all American adults ages 18 to 24 currently drink alcohol. Is the proportion of California college students who currently drink alcohol different from the proportion nationwide? A survey of 450 California college students indicates that 66% currently drink alcohol.

1. Write out the appropriate hypotheses
2. Find the p-value
3. Explain in words what the p-value means
4. State your conclusion (answer the question in context)

3. Jefferson Parish is a suburb of New Orleans, Louisiana. Its population is about 23% African American. Is there evidence that African Americans are underrepresented on juries in murder trials in Jefferson Parish? According to a New York Times article (June 4, 2007), there were 18 murder trials in Jefferson Parish between 1986 and 2007 in which the ethnicity of the jurors was known. Ten of the juries had no black jurors, 7 juries had 1 black juror, and 1 jury had 2 black jurors.

1. Write out the appropriate hypotheses
2. Find the p-value
3. Explain in words what the p-value means
4. State your conclusion (answer the question in context)
5. The following two hypotheses are tested:

* H0: The proportion of U.S. adults who oppose gay marriage is roughly 50%.
* Ha: The proportion of U.S. adults who oppose gay marriage is above 50% (i.e., the majority oppose).

Suppose a survey was conducted in which a random sample of 1,100 U.S. adults were asked about their opinions on gay marriage, and based on the data, the P-value was found to be 0.002.

Comment: Throughout this activity, use a 0.05 (5%) significance level (cutoff).

* 1. What does a p-value of 0.002 mean?
  2. Based on the P-value, what can you conclude?
  3. Say that the P-value was not given, but rather, the following conclusion was advertised: "The survey does not provide enough evidence to conclude that the majority of U.S. adults oppose gay marriage." What could have been the P-value that led to this conclusion?
  4. When would you conclude that the data provide enough evidence that the proportion of U.S. adults who oppose gay marriage is 50%?