

AP Stats
Chapter 8 Review

- 1) Changing from a 95 percent confidence interval estimate for a population proportion to a 99 percent confidence interval estimate, with all other things being equal,
 - A) Increases the interval size by 4%.
 - B) Decreases the interval size by 4%.
 - C) Increases the interval size by 31%.
 - D) Decreases the interval size by 31%.
 - E) This question cannot be answered without knowing the sample size.

- 2) A political action group wishes to learn the government approval rating on the environment. From a past study they know that they will have to poll 270 people for their desired level of confidence. If they want to keep the same level of confidence but divide the margin of error in third, how many people will they have to poll?

A) 30	B) 90	C) 468
D) 810	E) 2,430	

- 3) Using the same data, one student performs a test: $H_0: p = .85$ with $H_a: p \neq .85$; a second student performs a test $H_0: p = .85$ with $H_a: p < .85$. Even though both use the $\alpha = 0.05$ level of significance, the first student claims that there is not enough evidence to reject H_0 , and the second student claims there is enough evidence to reject H_0 . Which of the following could have been the value for the test statistic?

A) $z = -2.3$	B) $z = -1.8$	C) $z = -1.3$
D) $z = 1.3$	E) $z = 1.8$	

- 4) A sports magazine claims that home teams win 54 percent of the games in high school sports. An athletic director tests this claim by checking an SRS of 500 games and notes that the home team won 280 of them. With $H_0: p = 0.54$ and $H_a: p \neq 0.54$, what is the value of the test statistic?

A) $z = \frac{0.56 - 0.54}{\sqrt{500(.54)(1-.54)}}$
B) $z = 2 \frac{0.56 - 0.54}{\sqrt{500(.54)(1-.54)}}$
C) $z = \frac{0.56 - 0.54}{\sqrt{\frac{500}{(.54)(1-.54)}}}$
D) $z = 2 \frac{0.56 - 0.54}{\sqrt{\frac{500}{(.54)(1-.54)}}}$
E) $z = 2 \frac{0.56 - 0.54}{\sqrt{500(.54)(1-.56)}}$

- 5) In a SRS of 165 pet owners who do not use herbicides around the house, 23 had pets with lymphomas; in a SRS of 212 pet owners who do use herbicides, 87 had pets with lymphomas. A 90 percent confidence interval of the difference is reported to be -0.271 ± 0.071 . Which of the following is a proper conclusion?
 - A) The interval is invalid because it does not contain zero.
 - B) The interval is invalid because probabilities cannot be negative.
 - C) Pet owners who use herbicides are approximately 27.1 percent more likely to have pets with lymphomas than are pet owners who do not use herbicides.
 - D) Ninety percent of pet owners who use herbicides are approximately 27.1 percent more likely to have pets with lymphomas than are pet owners who do not use herbicides.
 - E) None of the above are proper conclusions.

- 6) Given that the power of a significance test against a particular alternative is 96 percent, which of the following is true?
- The probability of mistakenly rejecting a true null hypothesis is less than 4 percent.
 - The probability of mistakenly rejecting a true null hypothesis is 4 percent.
 - The probability of mistakenly rejecting a true null hypothesis is greater than 4 percent.
 - The probability of mistakenly failing to reject a false null hypothesis is 4 percent.
 - The probability of mistakenly failing to reject a false null hypothesis is different from 4 percent.
- 7) If all other variables remain constant, which of the following will increase the power of a hypothesis test?
- Increasing the sample size.
 - Increasing the significance level.
 - Increasing the probability of a Type II error
- I only
 - II only
 - III only
 - I and II
 - All are true.
- 8) We are interested in the proportion p of people who drive pick-up trucks in a large city. Seven percent of a simple random sample of 760 people say they drive pick-ups. What is the midpoint for a 99 percent confidence interval estimate of p ?
- .005
 - .495
 - .5
 - p
 - None of the above
- 9) Which of the following are true statements?
- A P -value is a conditional probability
 - The P -value is the probability that the null hypothesis is true.
 - A P -value is the probability that the null hypothesis is true given a particular observed statistic.
- I only
 - II only
 - III only
 - I and II
 - I and III
- 10) Suppose $H_0: p = .6$, $H_a: p > .6$, and against the alternative $p = .7$, the power is .8. Which of the following is a valid conclusion?
- The probability of committing a Type I error is .1.
 - If $p = .7$ is true, the probability of failing to reject H_0 is .2.
 - The probability of committing a Type II error is .3.
 - All of the above are valid conclusions.
 - None of the above are valid conclusions.
- 11) Before televised debates, a poll of 800 registered voters showed 560 in favor of a particular candidate; after the debates a poll of 600 voters showed 450 in favor of the candidate. Is there sufficient evidence that the candidate's popularity has increased-what is the test statistic?
- $$z = \frac{.7 - .75}{\sqrt{\frac{.7(1-.7)}{800} + \frac{.75(1-.75)}{600}}}$$
 - $$z = \frac{.7 - .75}{\sqrt{(.7214)(1-.7214) + \left(\frac{1}{800} + \frac{1}{600}\right)}}$$
 - $$z = \frac{.7 - .75}{\sqrt{800(.7)(1-.7) + 600(.75)(1-.75)}}$$
 - $$z = \frac{.7 - .75}{\sqrt{\frac{.725(1-.725)}{700}}}$$
 - $$z = \frac{.7 - .75}{\sqrt{700(.725)(1-.725)}}$$
- 12) For a given large sample size, which of the following gives the smallest margin of error in calculating a confidence interval for a population proportion?
- 90 percent confidence with $\hat{p} = .15$
 - 95 percent confidence with $\hat{p} = .15$
 - 99 percent confidence with $\hat{p} = .15$
 - 90 percent confidence with $\hat{p} = .23$
 - 95 percent confidence with $\hat{p} = .23$

- 13) In a well-known basketball study, it was reported that Larry Bird hit a second free throw in 48 out of 53 attempts after the first free throw was missed, and hit a second free throw in 251 of 285 attempts after the first free throw was made. Is there sufficient evidence to say that the probability that Bird will make a second free throw is different depending on whether or not he made the first free throw?
- A) $P < .001$, so this is very strong evidence that the probabilities are different.
 B) P is between .001 and .01, so this is strong evidence that the probabilities are different.
 C) P is between .01 and .05, so this is moderate evidence that the probabilities are different.
 D) P is between .05 and .10, so there is some evidence that the probabilities are different.
 E) $P > .10$, so there is little or no evidence that the probabilities are different.
- 14) Which of the following statements are true?
- I) If a population parameter is known, there is no reason to run a hypothesis test on that population parameter.
 II) The P -value can be negative or positive depending upon whether the sample statistic is less than or greater than the claimed value of the population parameter in the null hypothesis.
 III) The P -value is based on a specific test statistic so must be chosen before an experiment is conducted.
- A) I only
 B) II only
 C) III only
 D) I and II
 E) None are true
- 15) When an online news magazine asked viewers to click their agreement or disagreement, 300 out of 1,200 respondents agreed with a statement that the most practical way of becoming a millionaire is winning a lottery. Immediate feedback stated that 25 percent of the viewers, with a margin of error of ± 2.5 percent, agreed with the statement. Fine print claimed 95 percent confidence. What is the proper conclusion?
- A) We are 95 percent confident that the proportion of viewers who believe that the most practical way of becoming a millionaire is winning a lottery is between .225 and .275
 B) Without knowing whether both np and $n(1-p)$ are > 10 , the calculation is inappropriate.
 C) Without knowing whether or not the 1,200 respondents are 10 percent of all viewers, the calculation is inappropriate.
 D) The z -distribution was inappropriately used instead of the t -distribution.
 E) The data was not an SRS, so the calculation is inappropriate.
- 16) The school superintendent wants to know what percentage of property owners are willing to support an increase in school taxes. What size sample should be obtained to determine with 90 percent confidence the support level to within 5 percent?
- A) 17
 B) 33
 C) 271
 D) 289
 E) 1,083
- 17) In a random survey of 450 adults, 28 percent said that they felt that their credit card debt is too high. With what degree of confidence can the pollster say that 28 ± 4 percent of adults believe that their credit card debt is too high?
- A) 70.0 percent
 B) 91.0 percent
 C) 94.1 percent
 D) 95.0 percent
 E) 96.0 percent
- 18) Which of the following are true statements?
- I) The P -value of a test is the probability of obtaining a result as extreme as the one obtained assuming the null hypothesis is true.
 II) If the P -value for a test is .043, the probability that the null hypothesis is true is .043
 III) When the null hypothesis is rejected, it is because it is not true.
- A) I only
 B) II only
 C) III only
 D) I and III only
 E) None of the above gives the complete set of true responses

- 30) A significance test of $H_0: p = p_0$ vs $H_a: p \neq p_0$ is to be performed with a significance level of α . The data will have sample size n . Which of the following will have the greatest effect on increasing the power of the test?
- A) Decrease α , decrease n
 - B) Decrease α , increase n
 - C) Increase α , decrease n
 - D) Increase α , increase n
 - E) Increase n only. Changing α has no effect on power.

ANSWER KEY:

- 1) C
- 2) E
- 3) B
- 4) C
- 5) E
- 6) D
- 7) D
- 8) E
- 9) A
- 10) B
- 11) B
- 12) A
- 13) E
- 14) A
- 15) E
- 16) C
- 17) C
- 18) A
- 19) E
- 20) D
- 21) E
- 22) A
- 23) A
- 24) E
- 25) E
- 26) E
- 27) E
- 28) D
- 29) D
- 30) D