AP Statistics - Chapter 8 Warm-Ups

The college newspaper of a large Midwestern university periodically conducts a survey of students on campus to determine the attitude on campus concerning issues of interest. Pictures of the students interviewed along with a quote of their response are printed in the paper. Students are interviewed by a reporter "roaming" the campus who selects students to interview "haphazardly." On a particular day the reporter interviews five students and asks them if they feel there is adequate student parking on campus. Four of the students say no. The proportion p that respond "no" is thus 0.8.

1. Referring to the information above, the standard error SE_p of the proportion is

A) 0.8 B) 0.64 C) 0.18 D) 0.032

2. Referring to the information above, which of the following assumptions for inference about a proportion using a confidence interval are violated in this example?

A) The data are an SRS from the population of interest B) The population is at least 10 times as large as the sample
C) We are interested in inference about a proportion D) There appear to be no violations

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A noted psychic was tested for ESP. The psychic was presented with 200 cards face down and asked to determine if the card was one of five symbols: star, cross, circle, square, or three wavy lines. The psychic was correct in 50 cases. Let *p* represent the probability that the psychic correctly identifies the symbol on the card in a random trial.

8. Referring to the information above, based on the results of the test, a 95% confidence interval for *p* is (assume the 400 trials can be treated as an SRS from the population of all guesses the psychic would make in his lifetime)

A) 0.25 ± 0.060 B) 0.25 ± 0.055 C) 0.25 ± 0.050
D) We can assert that p = 0.20 with 100% confidence because the psychic is just guessing

9. Referring to the information above, suppose you wished to see if there is evidence that the psychic is doing better than just guessing. To do this you test the hypotheses H_0: $p = 0.20$, H_a: $p > 0.20$ The *P*-value of your test is

A) between .10 and .05 B) between .05 and .01 C) between .01 and .001 D) below .001

10. Referring to the information above, how large a sample *n* would you need to estimate *p* with margin of error 0.01 with 95% confidence? Use the guess $p = 0.20$ as the value for *p*.

A) $n = 4330$ B) $n = 6147$ C) $n = 7203$ D) $n = 9604$

A sociologist is studying the effect of having children within the first two years of marriage on the divorce rate. Using hospital birth records, she selects a random sample of 200 couples that had a child within the first two years of marriage. Following up on these couples, she finds that 80 couples are divorced within five years.

16. Referring to the information above, a 90% confidence interval for the proportion of couples that had a child within the first two years of marriage and are divorced within five years is

A) 0.40 ± 0.035 B) 0.40 ± 0.044 C) 0.40 ± 0.057 D) 0.40 ± 0.068

17. Referring to the information above, to determine if having children within the first two years of marriage *increases* the divorce rate we should

A) test the hypotheses H_0: $p = 0.50$, H_a: $p \neq 0.50$ B) test the hypotheses H_0: $p = 0.50$, H_a: $p > 0.50$
C) test the hypotheses H_0: $p = 0.40$, H_a: $p > 0.40$ D) do none of the above

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An SRS of size 100 is taken from a population having proportion 0.8 of successes. An independent SRS of size 400 is taken from a population having proportion 0.5 of successes.

20. Referring to the information above, the sampling distribution for the difference in the sample proportions, $p_1 - p_2$, has mean

A) 0.3 B) the smaller of 0.8 and 0.5
C) 0.15 D) The mean cannot be determined without knowing the sample results

21. Referring to the information above, the sampling distribution for the difference in the sample proportions, $p_1 - p_2$, has standard deviation $\sigma_{\hat{p}_1 - \hat{p}_2}$ equal to

A) 1.3 B) 0.40 C) 0.047 D) 0.002

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22. An SRS of 100 of a certain popular model car in 1993 found that 20 had a certain minor defect in the brakes. An SRS of 400 of this model car in 1994 found that 50 had the minor defect in the brakes. Let p_1 and p_2 be the proportion of all cars of this model in 1993 and 1994, respectively, that actually contain the defect. A 90% confidence interval for $p_1 - p_2$ is 0.075 ± 0.071. Suppose the sample of 1993 cars consisted of only 10 cars, of which two had the minor brake defect. Suppose also the sample of 1994 cars consisted of only 40 cars, of which five had the minor brake defect. A 90% confidence interval for $p_1 - p_2$ is now

A) the same as that for the original sample of 100 and 400 cars
B) much narrower than that for the original sample of 100 and 400 cars
C) the same as 99% for the original sample of 100 and 400 cars
D) It is unsafe to compute using the normal distribution to approximate the sampling distribution of $p_1 - p_2$

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25. A manufacturer receives parts from two suppliers. An SRS of 400 parts from supplier 1 finds 20 defective. An SRS of 100 parts from supplier 2 finds 10 defective. Let p_1 and p_2 be the proportion of all parts from suppliers 1 and 2, respectively, that is defective. A 95% confidence interval for $p_1 - p_2$ is

A) $-.05 \pm 0.063$ B) $-.05 \pm 0.053$ C) $-.05 \pm 0.032$ D) $.05 \pm 0.032$

An SRS of 25 male faculty members at a large university found that 10 felt that the university was supportive of female and minority faculty. An independent SRS of 20 female faculty found that five felt that the university was supportive of female and minority faculty. Let p_1 and p_2 represent the proportion of all male and female faculty, respectively, at the university who felt that the university was supportive of female and minority faculty at the time of the survey.

30. Referring to the information above, a 95% confidence interval for $p_1 - p_2$ is

A) 0.15 ± 0.355 B) 0.15 ± 0.270 C) 0.15 ± 0.227 D) 0.15 ± 0.138

31. Referring to the information above, is there evidence that the proportion of male faculty members who felt the university was supportive of female and minority faculty is larger than the corresponding proportion for female faculty members? To determine this, you test the hypotheses H_0: $p_1 = p_2$, H_a: $p_1 > p_2$. The P-value of your test is

A) larger than .05
B) between .05 and .01
C) between .01 and .001
D) below .001

Warm ups
Answer Key

1. C
2. A
5. B
6. B
7. D
8. A
9. B
10. B
16. C
17. D
18. C
20. A
21. C
22. D
25. A
30. B
31. A