Review Chapter 12

Ch. 12 AP Statistics Name: Mr. Morton

**Directions:** Work on these sheets. Answer completely, but be concise. *A normal probability table is attached.*

**Part 1: Multiple Choice.** *Circle the letter corresponding to the best answer.*

1. Many television viewers express doubts about the validity of certain commercials. In an attempt to answer their critics, the Timex Corporation wishes to estimate the proportion of consumers who believe what is shown in Timex television commercials. Let $p$ represent the true proportion of consumers who believe what is shown in Timex television commercials. If Timex has no prior information regarding the true value of $p$, how many consumers should be included in their sample so that they will be 85% confident that their estimate is within 0.03 of the true value of $p$?
   (a) 400
   (b) 12
   (c) 576
   (d) 384
   (e) 544

$$1.44\sqrt{\frac{(.5)(.5)}{n}} \leq 0.03$$

2. A radio talk show host with a large audience is interested in the proportion $p$ of adults in his listening area think the drinking age should be lowered to eighteen. To find this out, he poses the following question to his listeners. "Do you think that the drinking age should be reduced to eighteen in light of the fact that eighteen-year-olds are eligible for military service?" He asks listeners to phone in and vote "yes" if they agree the drinking age should be lowered and "no" if not. You are told that the proportion $\hat{p}$ of those who phoned in and answered "yes" is $\hat{p} = 0.70$, and the standard error SE $\hat{p}$ of the proportion is 0.0459. The number of people who phoned in
   (a) is 50.
   (b) is 99.
   (c) is 100.
   (d) is 200.
   (e) cannot be determined from the information given.

SRS? Proceed w/ caution

$$0.0459 = \sqrt{\frac{0.7(0.3)}{n}}$$

3. An inspector inspects large truckloads of potatoes to determine the proportion $p$ in the shipment with major defects prior to using the potatoes to make potato chips. Unless there is clear evidence that this proportion is less than 0.10, she will reject the shipment. To reach a decision she will test the hypotheses

   $H_0: p = 0.10$, $H_a: p < 0.10$

   using the large sample test for a population proportion. To do so, she selects an SRS of 50 potatoes from the over 2000 potatoes on the truck. Suppose that only two of the potatoes sampled are found to have major defects.

   Which of the following conditions for inference about a proportion using a hypothesis test are violated?
   (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) n is so large that both $np_0$ and $n(1 - p_0)$ are 10 or more, where $p_0$ is the proportion with major defects if the null hypothesis is true.
   (d) There appear to be no violations.
   (e) More than one condition is violated.

4. The Gallup Poll interviews 1600 people. Of these, 18% say that they jog regularly. The news report adds: "The poll had a margin of error of plus or minus three percentage points." You can safely conclude that
   (a) 95% of all Gallup Poll samples like this one give answers within ±3% of the true population value.
   (b) The percent of the population who jog is certain to be between 15% and 21%.
   (c) 95% of the population jog between 15% and 21% of the time.
   (d) We can be 3% confident that the sample result is true.
   (e) If Gallup took many samples, 95% of them would find that exactly 18% of the people in the sample jog.

5. 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 who 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.

   To determine if having children within the first two years of marriage increases the divorce rate we should test
   (a) Hypotheses $H_0$: $p = 0.50$, $H_a$: $p \neq 0.50$.
   (b) Hypotheses $H_0$: $p = 0.50$, $H_a$: $p > 0.50$.
   (c) Hypotheses $H_0$: $p = 0.50$, $H_a$: $p < 0.50$.
   (d) Hypotheses $H_0$: $p = 0.40$, $H_a$: $p > 0.40$.
   (e) None of the above.

6. In a poll, (a) some people refused to answer questions, (b) people without telephones could not be in the sample, and (c) some people never answered the phone in several calls. Which of these sources is included in the ±2% margin of error announced for the poll?
   (a) Only source (a).
   (b) Only source (b).
   (c) Only source (c).
   (d) All three sources of error.
   (e) None of these sources of error.

7. A polling organization announces that the proportion of American voters who favor congressional term limits is 64 %, with a 95% confidence margin of error of 3%. If the opinion poll had announced the margin of error for 80% confidence rather than 95% confidence, this margin of error would be
   (a) 3%, because the same sample is used.
   (b) Less than 3%, because we require less confidence.
   (c) Less than 3%, because the sample size is smaller.
   (d) Greater than 3%, because we require less confidence.
   (e) Greater than 3%, because the sample size is smaller.