AP Stats
Chap 18
Textbook Questions Name _____ Pd _____

Show all necessary work and place your answers on the spaces provided.

Conditions.

Consider each situation described below. Identify the population of the sample, explain what p and $\hat{p}$ represent, and tell whether the methods of this chapter can be used to create a confidence interval.

1. Police set up an auto checkpoint at which drivers are stopped and their cars inspected for safety problems. They find that 14 of the 134 cars stopped have at least one safety violation. They want to estimate the percentage of all cars that may be unsafe.

2. A TV talk show asks viewers to register their opinions on prayer in schools by logging on to a web site. Of the 602 people who voted, 488 favored prayer in schools. We want to estimate the level of support among the general public.

3. A school is considering requiring students to wear uniforms. The PTSA surveys parent opinion by sending a questionnaire home with all 1245 students; 380 surveys are returned, with 228 families in favor of the change.

4. A college admits 1632 freshmen one year, and four years later 1388 of them graduate on time. The college wants to estimate the percentage of all their freshmen enrollees who graduate on time.

5. A consumer group hoping to access customer experiences with auto dealers surveys 167 people who recently bought new cars; 3% of them expressed dissatisfaction with the salesperson.

6. What percent of college students have cell phones? 2883 students were asked as they entered a football stadium, and 243 indicated they had phones with them.

7. 240 potato plants in a field in Maine are randomly checked and only seven show signs of blight. How severe is the blight problem for the US potato industry?

8. 12 of the 309 employees of a small company suffered an injury on the job last year. What can the company expect in future years?

Catalog Sales.
A catalog sales company promises to deliver orders placed on their internet site within three days. Follow-up calls to a few randomly selected customers show that a 95% confidence interval for the proportion of all orders that arrive on time is 88% +/- 6%. What does this mean? Are the following conclusions correct? Explain.

a. Between 82% and 94% of all orders arrive on time.

b. 95% of all random samples of customers will show at 88% of orders arrive on time.

c. 95% of all random samples of customers will show that 82% to 94% of orders arrive on time.

d. We are 95% sure that between 82% and 94% of the orders placed by customers in this sample arrived on time.

e. On 95% of the days, between 82% and 94% of the orders will arrive on time.

Euro Spinning.
In January 2002, two students made worldwide headlines by spinning a Belgian euro 250 times and getting 140 heads – that's 56%. That makes the 90% confidence interval (51% , 61%). What does this mean? Are the following conclusions correct? Explain.

a. Between 51% and 61% of the euros are unfair.

b. We are 90% sure that in this experiment this euro landed heads on between 51% and 61% of the spins.

c. We are 90% sure that spun euros will land heads between 51% and 61% of the time.

d. If you spin a euro many times, you can be 90% sure of getting between 51% and 61% heads.

e. 90% of all spun euros will land heads between 51% and 61% of the time.

Confidence Intervals.
Several factors are involved in the creation of a confidence interval. Among them are the sample size, the level of confidence, and the margin of error. Which of the following statements are true?

a. For a given sample size, higher confidence means a smaller margin of error.

b. For a specified confidence level, larger samples provide smaller margins of errors.

c. For a fixed margin of error, larger samples provide greater confidence.

d. For a given confidence level, halving the margin of error requires a sample twice as large.

e. For a given sample size, reducing the margin of error will mean lower confidence.

f. For a certain confidence level, you get a smaller margin of error by selecting a bigger sample.

g. For a fixed margin of error, smaller samples will mean lower confidence.

h. For a given confidence level, a sample nine times as large will make a margin of error on third as big.