Quiz 8.1A AP Statistics Name:

1. A consumer watchdog organization estimates the mean weight of 1-ounce "Fun-Size" candy bars to see if customers are getting full value for their money. A random sample of 25 bars is selected and weighed, and the organization reports that a 90% confidence interval for the true mean weight of the candy bars is 0.992 to 0.998 ounces.

(a) What is the point estimate from this sample?

(b) What is the margin of error?

(c) Interpret the 90% confidence *interval* 0.992 to 0.998 in the context of the problem.

(d) Interpret the confidence *level* of 90% in the context of the problem.

2. A manufacturer of flashlights wants to know how well one of their newer styles is selling in a chain of large home-improvement stores. They select a simple random sample of 20 stores, record how many of the flashlights were sold in a 30-day period, and construct a 95% confidence interval for the mean number of flashlights sold.

   (a) If, instead of constructing a 95% confidence interval, the flashlight manufacturer constructed a 98% confidence interval, would the 98% interval be wider, narrower, or the same width as the 95% interval? Explain.

   (b) How would the width of confidence interval change if the flashlight manufacturer took a larger sample? Explain.

   (c) The 20 stores in the sample were actually the only stores who provided sales figures from 36 stores that were randomly chosen to be in the sample. Can the manufacturer adjust the confidence interval to take this nonresponse into account? If so, how? If not, why not?

Quiz 8.1B AP Statistics Name:

1. Crop researchers are interested in the productivity of a new variety of corn. They plant 25 plots with randomly-selected seeds of the new variety, record the yield in bushels per acre, and find that a 99% confidence interval for the true mean yield is 118 to 130 bushels per acre.

(a) What is the point estimate from this sample?

(b) What is the margin of error?

(c) Interpret the 99% confidence *interval* 118 to 130 in the context of the problem.

(d) Interpret the confidence *level* of 99% in the context of the problem.

2. A university health services physician is concerned about how much sleep freshman are getting in the first few months of school. She asks a simple random sample of 20 students how much sleep they got the previous night and constructs a 95% confidence interval for the mean amount of sleep in hours.

(a) If, instead of constructing a 95% confidence interval, the physician constructed a 90% confidence interval, would the 90% interval be wider, narrower, or the same width as the 95% interval? Explain.

(b) How would the width of confidence interval change if the physician took a larger sample? Explain.

(c) After calculating the interval, the physician realizes that the sample was drawn only from the 70% of freshman who had turned in their health forms by the time they arrived on campus. Can she adjust the confidence interval to take this undercoverage into account? If so, how? If not, why not?

Quiz 8.1C AP Statistics Name:

1. Suppose you know that the distribution of finishing times for a certain crossword puzzle has a mean of 25 minutes, a standard deviation of 8 minutes, and is moderately skewed left. You take an SRS of 45 finish times from this distribution and calculate the mean finish time, $\bar{x}$.

(a) Describe the shape, center, and spread of the sampling distribution of $\bar{x}$.

(b) Find a number, k, such that 95% of the values in the sampling distribution will lie within k minutes of the mean of the distribution.

(c) If you take repeated samples of size 45 from this population, what proportion of the time will the interval $\bar{x} \pm k$ contain the number 25? Explain.

2. The confidence level is sometimes called the "capture rate." Explain why this is an appropriate term.

3. An insect ecologist reports a 95% confidence interval for the mean length of full-grown aquatic larvae of the Phantom Midge *Chaoborus albatus* to be 6.9 to 8.5 mm, based on a sample of 9 individual larvae.

(a) What are the point estimate and margin of error associated with this confidence interval?

(b) If the ecologist had reported a 99% confidence interval instead of a 95% interval, how would it have been different? Explain.

(c) The ecologist was unhappy with how wide this interval was. What should he do to produce a narrower interval with the same level of confidence? Explain.