Statistics 13V NAME:_____
Sample Quiz 8 Last six digits of Student ID#:_____

For multiple choice questions circle the best answer. For other questions provide the information requested. Each problem is worth 10 points unless shown otherwise. ***Open book and notes.***

1. Which of the following examples involves **paired data**? (Only one choice is correct)
   A. A psychologist compares two methods of memorizing information. Twenty people use one method and twenty other people use the second method.
   B. A researcher estimates the difference between the mean forearm lengths of men and women based on a random sample of each.
   C. A medical researcher measures the cholesterol levels of each of 30 heart attack patients 2 days after the attack and again 4 days after the attack.
   D. A marketing research expert estimates the proportion of the 22 to 29 year-old age group that says they might buy a new car in the next two years

2. For which of the following situations would the Rule for Sample Means *not* apply?
   A. A random sample of size 20 is drawn from a skewed population.
   B. A random sample of size 50 is drawn from a skewed population.
   C. A random sample of size 20 is drawn from a bell-shaped population.
   D. A random sample of size 50 is drawn from a bell-shaped population.

3. What is the *primary* purpose of a 95% confidence interval for a mean?
   A. to estimate a sample mean
   B. to test a hypothesis about a sample mean
   C. to estimate a population mean
   D. to provide an interval that covers 95% of the individual values in the population

4. If two different samples of the same size are taken from the same population and the sample mean and standard deviation are calculated, the numerical value for which of the following could *not* change?
   A. The population mean.
   B. The sample mean
   C. The sample standard deviation
   D. The standard error of the mean of the sampling distribution.

5. (**20 pts**) An anthropologist is comparing the physical measurements of people in an isolated region of a country to physical measurements of people in another region. For a random sample of 9 men in the isolated region, the mean head circumference is $\bar{x} = 57.3$ cm and the sample standard deviation is $s = 2$ cm. Assume the head circumferences are bell-shaped. Find a 95% confidence interval for the population mean head circumference for the men in the isolated region.

Scenario for Questions 6 and 7: Suppose that in the population of twin pairs where one twin is male and one is female, the height differences (male height – female height) are bell-shaped with a mean of 2 inches and a standard deviation of 1 inch. A random sample of 16 such twin pairs is to be taken, and the differences measured.

6. (**20 pts**) Describe the sampling distribution of the sample mean for these differences, including its shape, its mean and its standard deviation. You may draw a picture of the distribution if you wish, to help in answering the next question. Use appropriate notation.

7. Find the probability that the mean difference in height (male height – female height) for the 16 sampled pairs will be less than 1.5 inches. Show your work.

8. The t* multiplier is used in confidence intervals for means instead of the z* multiplier because
   A. The sample standard deviation is not known.
   B. The standard error of the mean is not known.
   C. The population standard deviation is not known.
   D. The sampling distribution of the mean is not bell-shaped.