1. A 99% confidence interval for the mean

    a) excludes the mean with 99% probability
    b) includes the mean with 99% probability
    c) is narrower than a 95% confidence interval for the mean
    d) is wider than a 95% confidence interval for the mean
    e) is obtained as the sample average plus 2 standard deviations

2. In a sample of 100 healthy women between 25 and 29 years of age, systolic blood pressure was found to follow a normal distribution. If the sample mean blood pressure was 120 mm Hg and the population standard deviation was 10 mm Hg, what interval of blood pressure would represent an approximate 95% confidence interval for the true mean μ?

    a) 118 to 122 mm Hg
    b) 100 to 140 mm Hg
    c) 119 to 121 mm Hg
    d) 100 to 130 mm Hg
    e) 90 to 150 mm Hg

3. How will the length of a confidence interval, for the population, mean change when

    a) sample size is increased
        1) increases
        2) decreases
        3) stays the same

    b) variation in the population is higher
        1) increases
        2) decreases
        3) stays the same

    c) confidence level is increased from 95% to 99%
        1) increases
        2) decreases
        3) stays the same

    d) sample mean is larger
        1) increases
        2) decreases
        3) stays the same

4. An experimenter reports that on the basis of a sample size of 10 units, she calculated the 95% confidence limits for the mean height to be 66 and 74 inches. Assuming the calculations are correct, the resulting confidence interval can be interpreted as having the meaning:

    a) There is a 95% probability that the population mean height lies between 66 and 74 inches.
    b) We have 95% confidence that a person's height lies between 66 and 74 inches.
    c) We have 95% confidence that the population mean height lies between 66 and 74 inches.
    d) 95% of the population has a height between 66 and 74 inches.

5. A 95% confidence intervals implies that

   a) the t-test gives correct intervals 95% of the time
   b) if we repeated draw representative samples and construct such interval estimates, we expect, on average, 95% of them to contain the true mean
   c) the probability that the interval is false is 0.95.
   d) there is a 95% probability that the underlying distribution is normal.

6. Student's t distribution with 10 degrees of freedom

   a) has heavier tails than a standard normal distribution
   b) can be used to obtain confidence limits for the mean of a normal distribution from a sample of 11 observations
   c) has mean equal to zero

   1. a
   2. b
   3. c
   4. **a, b, c**

7. An investigator is interested in the mean cholesterol level of patients with coronary heart disease. On the basis of a random sample of 50 such patients, a 95% confidence interval for the mean has a width of 10 mg/dl. How large a sample would be expected to have given an interval width of about 5 mg/dl? (Assume the population standard deviation is known.)

   a) 100
   b) 200
   c) 300
   d) 400
   e) 800

8. A 95% confidence interval for the mean cholesterol level of adults over 65 years of age is (198, 208) mg/dl. The mean cholesterol level for adults 40-60 years of age is 191 mg/dl. If we were to perform a two-sided hypothesis test of Ho: μ=191 mg/dl, we would:

   a) accept the null hypothesis at the 5% significance level
   b) reject the null hypothesis at the 5% significance level
   c) accept the null hypothesis at the 1% significance level
   d) reject the null hypothesis at the 1% significance level
   e) can't tell

9. The smaller the magnitude of the z or t-statistic, the smaller is the corresponding p-value.

   True **False**

10. A 99% confidence interval implies

   a) The probability the given interval contains the true parameter is 0.99.
   b) The probability that 99% of the individuals are contained in the interval is 0.99.
   c) The probability that 99% of the sample means are contained in the interval is 0.99.
   d) On average, we would expect 99 out of 100 of similarly constructed intervals to contain the true parameter.
   e) The probability the given interval contains the true parameter is 0.01.

11. Weight loss is a major manifestation of infection with HIV. A study was carried out to analyze weight change in 9 male subjects with State IV HIV infection. The average weight loss per month for the 9 men was 5.97 kg/month with a sample standard deviation of 2.687 kg/month. Construct a 95% confidence interval for the true mean weight loss per month of HIV positive males in State IV HIV infection. Interpret the results.

$$\bar{X} \pm t(n-1, 1-\frac{\alpha}{2}) \times s/\sqrt{n} = (5.97 \pm t(8, .975) \times \frac{2.687}{\sqrt{9}} = (3.90, 8.04)\ Kg$$

Under repeated sampling, one would expect the intervals constructed in this manner to contain the true mean weight loss per month for HIV+ males 95 percent of the time.

12. There is a general concern about the escalating costs of providing health care in the United States. One of the components contributing to the increasing costs is the length of the hospital stay of a patient. In a sample of 23 patients, the mean time was 4.5 days with a sample standard deviation of 1.3 days. Find a 95% confidence interval for the true mean length of hospital days.

$$\bar{X} \pm t(n-1, 1-\frac{\alpha}{2}) \times s/\sqrt{n} = (4.5 \pm t(22, .975) \times \frac{1.3}{\sqrt{23}} = (3.94, 5.06)\ days$$

The length of stay (in days) is probably positively skewed since the minimum number of days is zero, and there will be some patients who stay in the hospital for extended periods of time.