Test Your Knowledge– Estimation
SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Use the given degree of confidence and sample data to construct a confidence interval for the population proportion p.

1) A survey of 865 voters in one state reveals that 408 favor approval of an issue before the   1) _____
legislature. Construct the 95% confidence interval for the true proportion of all voters in
the state who favor approval.

2) A survey of 300 union members in New York State reveals that 112 favor the Republican   2) _____
candidate for governor. Construct the 98% confidence interval for the true population
proportion of all New York State union members who favor the Republican candidate.

3) When 297 college students are randomly selected and surveyed, it is found that 126 own   3) _____
a car. Find a 99% confidence interval for the true proportion of all college students who
own a car.

4) Of 86 adults selected randomly from one town, 68 have health insurance. Find a 90%   4) _____
confidence interval for the true proportion of all adults in the town who have health
insurance.

Use the confidence level and sample data to find a confidence interval for estimating the population μ.

5) A random sample of 78 light bulbs had a mean life of $\overline{x}$ = 409 hours with a standard   5) _____
deviation of σ = 37 hours. Construct a 90 percent confidence interval for the mean life, μ,
of all light bulbs of this type.

6) A laboratory tested 75 chicken eggs and found that the mean amount of cholesterol was   6) _____
185 milligrams with s = 13.9 milligrams. Construct a 95 percent confidence interval for
the true mean cholesterol content, μ, of all such eggs.

7) 43 packages are randomly selected from packages received by a parcel service. The   7) _____
sample has a mean weight of 12.5 pounds and a standard deviation of 3.6 pounds. What
is the 95 percent confidence interval for the true mean weight, μ, of all packages received
by the parcel service?

8) A group of 65 randomly selected students have a mean score of 31.8 with a standard   8) _____
deviation of 5.4 on a placement test. What is the 90 percent confidence interval for the
mean score, μ, of all students taking the test?

Use the margin of error, confidence level, and standard deviation σ to find the minimum sample size required to estimate an unknown population mean μ.

9) Margin of error: $124, confidence level: 95%, σ = $599   9) _____

10) Margin of error: $128, confidence level: 99%, σ = $564   10) _____

Find the minimum sample size you should use to assure that your estimate of $\hat{p}$ will be within the required margin of error around the population p.

11) Margin of error: 0.07; confidence level: 90%; from a prior study, $\hat{p}$ is estimated by 0.17.   11) _____

12) Margin of error: 0.009; confidence level: 99%; from a prior study, $\hat{p}$ is estimated by 0.161   12) _____

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Use the given degree of confidence and sample data to construct a confidence interval for the population mean μ. Assume that the population has a normal distribution.

13) Thirty randomly selected students took the calculus final. If the sample mean was 77 and the standard deviation was 6.7, construct a 99 percent confidence interval for the mean score of all students.

13) _____

14) A sociologist develops a test to measure attitudes about public transportation, and 27 randomly selected subjects are given the test. Their mean score is 76.2 and their standard deviation is 21.4. Construct the 95% confidence interval for the mean score of all such subjects.

14) _____

15) A savings and loan association needs information concerning the checking account balances of its local customers. A random sample of 14 accounts was checked and yielded a mean balance of $664.14 and a standard deviation of $297.29. Find a 98% confidence interval for the true mean checking account balance for local customers.

15) _____

16) The principal randomly selected six students to take an aptitude test. Their scores were:
    76.4   71.0   75.6   72.6   81.9   82.6
    Determine a 90 percent confidence interval for the mean score for all students.

16) _____

17) The amounts (in ounces) of juice in eight randomly selected juice bottles are:
    15.0 15.5 15.0 15.0
    15.3 15.3 15.6 15.0
    Construct a 98 percent confidence interval for the mean amount of juice in all such bottles.

17) _____

18) The football coach randomly selected ten players and timed how long each player took to perform a certain drill. The times (in minutes) were:
    5.8   6.5 12.7 12.9   8.7
    5.4 12.5 14.1   9.9   8.3
    Determine a 95 percent confidence interval for the mean time for all players.

18) _____

Use the given degree of confidence and sample data to find a confidence interval for the population standard deviation σ. Assume that the population has a normal distribution.

19) The mean replacement time for a random sample of 20 washing machines is 10.2 years and the standard deviation is 2.6 years. Construct a 99% confidence interval for the standard deviation, σ, of the replacement times of all washing machines of this type.

19) _____

20) A sociologist develops a test to measure attitudes about public transportation, and 27 randomly selected subjects are given the test. Their mean score is 76.2 and their standard deviation is 21.4. Construct the 95% confidence interval for the standard deviation, σ, of the scores of all subjects.

20) _____

21) The football coach randomly selected ten players and timed how long each player took to perform a certain drill. The times (in minutes) were:
    13   11   10   10   12
     5   7   13   6   11
    Find a 95 percent confidence interval for the population standard deviation σ.

21) _____

22) The amounts (in ounces) of juice in eight randomly selected juice bottles are:

    15.5 15.2 15.7 15.0
    15.3 15.9 15.4 15.3

Find a 98 percent confidence interval for the population standard deviation σ.

22) _____

1) $0.438 < p < 0.505$
2) $0.308 < p < 0.438$
3) $0.350 < p < 0.498$
4) $0.719 < p < 0.863$
5) $402 < \mu < 416$
6) $182 < \mu < 188$
7) $11.4 < \mu < 13.6$
8) $30.7 < \mu < 32.9$
9) 90
10) 129
11) 78
12) 11,058
13) $73.63 < \mu < 80.37$
14) $67.7 < \mu < 84.7$
15) $\$453.59 < \mu < \$874.69$
16) $72.78 < \mu < 80.58$
17) $15.00 < \mu < 15.43$
18) $7.39 < \mu < 11.97$
19) $1.8 \text{ yr} < \sigma < 4.3 \text{ yr}$
20) $16.9 < \sigma < 29.3$
21) (2.0, 5.2)
22) (0.18, 0.68)