Honors Statistics Chapter 6 Review

1.   True or false: A large sample size produces a wider confidence interval.
2.   True or false: A higher level of confidence produces a wider confidence interval.

3.   A wildlife study finds the mean weight of salmon caught by an Alaskan fishing company. How large a sample should be taken to be 94% confident that the sample mean is within 0.2 pound of the true mean weight? A preliminary study shows the standard deviation to be 2.15 pounds.

A random sample of medical files is used to estimate the proportion of all people who have blood type B.
4.   If you have no preliminary estimate for p, how many medical files should you include in a random sample in order to be 99% confident that the the point estimate is within 5%?

5.   If you use a preliminary estimate that 8 of 90 people have blood type B, what would be the minimum sample size required? (Use the same level of confidence and margin of error from #4)

30 small communities in Connecticut gave an average of 138.5 reported cases of larceny per year. Assume σ is known to be 42.6 cases per year and the distribution is normal.
6.   State the assumptions necessary to construct a valid confidence interval.
7.   What is the point estimate for this data?
8.   Construct a 90% confidence interval for the mean number of cases.
9.   Write a statement that interprets the 90% confidence interval.

Results if a poll of a random sample of 3003 American adults shows that 610 of them do not know that caffeine contributes to dehydration.
10.   State the assumptions necessary to construct a valid confidence interval.
11.   What is the point estimate for this data?
12.   Construct a 95% confidence interval for this proportion of adults.
13.   Write a statement that interprets the 95% confidence interval.
14.   A previous study found that 15% of adults knew that caffeine contributed to dehydration. Do the results of this survey agree with this statistic? Explain.

Adult mountain lions were captured and released and weighed. Their weights are listed below. Assume their weights are normally distributed.

68	104	128	122	60	64

15.   State the assumptions necessary to construct a valid confidence interval for the mean weights of the mountain lions.
16.   What is the point estimate for this data?
17.   Construct a 98% confidence interval for the mean weights of the mountain lions.
18.   Write a statement that interprets the 98% confidence interval.

Find the appropriate z or t for the situation.   If neither applies, explain why.
19.   s = 11.6, population is normal; sample size is 15; 90% confidence interval
20. σ = 2.6; populaton is skewed; sample size is 13;   92% confidence interval
21.   s = 4.1; population is skewed;   sample size is 37; 99% confidence interval
22. σ = 10.4; population is normal; sample size is 48; 95% confidence interval
23.   s = 5.9; population is normal; sample size is 19; 80% confidence interval

Review Answers

1.   False. The larger the sample size, the smaller margin of error, which means a narrow confidence interval.
2.   True. The larger the level of confidence, the wider the confidence interval.

3.   409
4.   664
5.   215

6.   SRS/ sigma known/ normal or n > 30
7. $\bar{x} = 138.5$
8.   (125.71, 151.29)
9.   I am 90% confident that the true mean of reported cases of larceny in small communities of Connecticut is between 125.71 and 151.29.

10.   SRS/ binomial/ np ≥ 5 and nq ≥ 5
11. $\hat{p}$ = 610/3003 (approx. 0.203)
12.   (.189, .218)
13.   I am 95% confident that the true proportion of adults that do not know that caffeine contributes to dehydration is between .189 and .218.
14.   No. 15% does not fall between 18.9% and 21.8%.

15.   SRS/ normal or n > 30
16. $\bar{x}$ = 91
17.   (48.8, 133.2)
18.   I am 98% confident that the true mean of mountain lion weights is between 48.8 pounds and 133.2 pounds .

19.   t = 1.761
20.   Neither. Population is skewed and sample size is less than 30.
21.   t = 2.719
22.   z = 1.96
23.   t = 1.330