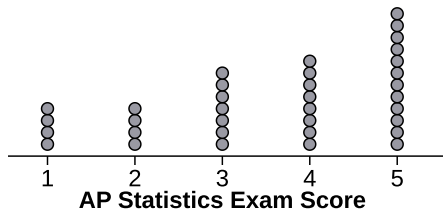


Lesson #55 · Topic 4B · Practice

Name _____

1. An AP Statistics teacher at a very large high school selects a random sample of 35 AP Exam scores from the population of 356 AP Exam scores in a recent year from her school. The results are shown in the graph.



- a. Name the three conditions for constructing a confidence interval for the mean AP Exam score of all AP Statistics students at this high school. Explain why each condition must be checked.
- b. Check each of the conditions for this scenario.

2. Shruthi wants to estimate the mean number of hours of music listened to each week for all students in her high school using a 90% confidence interval. She is considering 3 different sample sizes: $n = 20$, $n = 30$, and $n = 40$.
- Which sample size will require the largest t^* critical value? Explain.
 - Calculate the critical value t^* for each sample size using Table B. Be sure to include the degrees of freedom (df) used to find t^* .
 - Calculate the critical value t^* for each sample size using technology. How do they compare to the answers in part (b)?
 - Why does Shruthi use a critical value of t^* rather than z^* ?

3. Davidson wants to estimate the average number of goals scored during the regular season for the top 100 goal scorers in the National Hockey League (NHL). He selects a random sample of 10 of these players and finds a sample mean of 30.1 goals and a sample standard deviation of 5.896 goals. He plans to construct a 98% confidence interval for the true mean number of goals scored. Assume all conditions for inference are met.
- Calculate the t^* critical value.
 - Calculate the standard error and margin of error.
 - Calculate the 98% confidence interval.
 - Davidson guessed the true mean number of goals scored for the top 100 hockey players would be 35 goals scored during the regular season. Use the 98% confidence interval to comment on his guess.
4. In a recent year, it was reported that the typical family on a moderate budget spends an average of \$302.80 per week on groceries. Anderson wonders if this is true for the families on a moderate budget in his town, so he selects a random sample of 15 of them. The distribution of the sample of weekly grocery bills is strongly skewed right with a mean of \$415.20, a standard deviation of \$85.25, and one outlier at \$724.50.
- Anderson plans to construct a 99% confidence interval for the mean amount spent on groceries each week for families in his town on a moderate budget. Which condition for inference is not met?
 - Suppose he decides to sample 40 families instead, but the sample has one outlier. Can he consider the sampling distribution for the sample mean approximately normal with the new sample size?
 - If everything else stays the same, how does increasing the sample size affect the margin of error?

5. Rotten Tomatoes is a website that rates movies on a scale from 0 to 100. A group of students in an AP Statistics selected a random sample of 30 Netflix original movies that were released in recent years and found their Rotten Tomatoes scores. The mean for their sample was 62 with a standard deviation of 6.5. Based on these data, they constructed a 95% confidence interval for the true mean Rotten Tomatoes score for all Netflix original movies released in recent years.
- Define the parameter of interest.
 - Check the appropriate conditions.
 - Calculate t^* and the margin of error.
 - Calculate and interpret the 95% confidence interval.
 - Netflix claims their average Rotten Tomatoes score is 65. Does the interval calculated in part (d) support this claim? Explain.

6. Consider the following three distributions: a standard normal distribution, a t -distribution with 10 degrees of freedom, and a t -distribution with 20 degrees of freedom. Which of the following orders the three distributions from lowest variability to highest variability?
- A) standard normal, t -distribution with $df = 20$, t -distribution with $df = 10$
 - B) standard normal, t -distribution with $df = 10$, t -distribution with $df = 20$
 - C) t -distribution with $df = 10$, t -distribution with $df = 20$, standard normal
 - D) t -distribution with $df = 20$, t -distribution with $df = 10$, standard normal
7. When constructing a confidence interval to estimate a population mean, one condition that must be checked is the random condition. It is important to check the random condition so that
- A) the standard deviation formula is correct when sampling without replacement.
 - B) the sampling distribution for the sample mean is approximately normal.
 - C) the sample results can be generalized to the population.
 - D) the mean of the sample is equal to the population mean.