16 subjects had a mean wake time of 98.9 min and a standard deviation of 42.3 min (based on data from "Cognitive Behavioral Therapy vs Zopiclone for Treatment of Chronic Primary Insomnia in Older Adults," by Siversten et al., *Journal of the American Medical Association,* Vol. 295, No. 24). Assume that the 16 sample values appear to be from a normally distributed population and construct a 98% confidence interval estimate of the mean wake time for a population with zopiclone treatments. What does the result suggest about the mean wake time of 102.8 min before the treatment? Does zopiclone appear to be effective?

17. Harry Potter Listed below are the gross amounts (in millions of dollars) earned from box office receipts for the movie *Harry Potter and the Half-Blood Prince.* The movie opened on a Wednesday, and the amounts are listed in order for the first 14 days of the movie's release. Use the sample values to construct a 99% confidence interval estimate of the population mean. What is the population? Identify at least one major problem with this data set.

58 22 27 29 21 10 10 8 7 9 11 9 4 4

18. Years in College Listed below are the numbers of years it took for a random sample of college students to earn bachelor's degrees (based on data from the National Center for Education Statistics). Construct a 90% confidence interval estimate of the mean time required for all college students to earn bachelor's degrees. Does the confidence interval contain the value of 4 years? Is there anything about the data that would suggest that the confidence interval might not be a good result?

4 4 4 4 4 4 4.5 4.5 4.5 4.5 4.5 4.5 6 6 8 9 9 13 13 15

19. Cell Phone Radiation Listed below are the measured radiation emissions (in W/kg) corresponding to these cell phones: Samsung SGH-tss9, Blackberry Storm, Blackberry Curve, Motorola Moto, T-Mobile Sidekick, Sanyo Katana Eclipse, Palm Pre, Sony Ericsson, Nokia 6085, Apple iPhone 3G S, Kyocero Neo E1100. The data are from the Environmental Working Group. The media often present reports about the dangers of cell phone radiation as a cause of cancer. Construct a 90% confidence interval estimate of the population mean. What does the result suggest about the Federal Communications Commission standard that cell phone radiation must be 1.6 W/kg or less?

0.38 0.55 1.54 1.55 0.50 0.60 0.92 0.96 1.00 0.86 1.46

20. Ages of Race Car Drivers Listed below are the ages (years) of randomly selected race car drivers (based on data reported in *USA Today*). Construct a 98% confidence interval estimate of the mean age of all race car drivers.

32 32 33 33 41 29 38 32 33 23 27 45 52 29 25

21. Lead in Medicine Listed below are the lead concentrations (in μg/g) measured in different Ayurveda medicines. Ayurveda is a traditional medical system commonly used in India. The lead concentrations listed here are from medicines manufactured in the United States. The data are based on the article "Lead, Mercury, and Arsenic in US and Indian Manufactured Ayurvedic Medicines Sold via the Internet," by Saper et al., *Journal of the American Medical Association,* Vol. 300, No. 8. Use the sample data to construct a 95% confidence interval estimate of the mean of the lead concentrations for the population of all such medicines. If a safety standard requires lead concentrations less than 7 μg/g, does it appear that the population mean is less than that level?

3.0 6.5 6.0 5.5 20.5 7.5 12.0 20.5 11.5 17.5

22. Brain Volume Listed below are brain volumes (cm^3) of unrelated subjects used in a study. (See Data Set 6 in Appendix B.) Use the sample data to construct a 99% confidence interval estimate of the mean of the brain volume of the population. Given that typical brain volumes are between 950 cm^3 and 1800 cm^3, do these values appear to be typical?

963 1027 1272 1079 1070 1173 1067 1347 1100 1204