

1. The owner of a local theater is concerned that DVD players are hurting business because people can simply rent DVDs and watch movies at home. The owner has directed the theater staff to estimate the mean number of movies rented by people in October. A random sample of 300 homes resulted in a sample mean of 2.4 movies and an estimated standard deviation of 1.6 movies. Develop and interpret the 95% confidence interval estimate for the mean number of movies rented per month.

ANSWER: The mean number of movies rented per month is between 2.2189 to 2.5811 movies at a confidence level of 95% and a sample of size 300.

2. Marine World is a facility where people can see animals from the ocean on display and performing in shows. Customers pay for a full-day ticket. Management is interested in determining the average length of time customers actually spend at the park. A total of 144 customers were surveyed producing a sample mean of 311 minutes and an estimated population standard deviation of 72 minutes. Develop the 90% confidence interval estimate for the mean number of minutes that customers stay in the park.

ANSWER: The average amount of time customers spend in the park is between 301.13 to 320.87 minutes at a confidence level of 90% and a sample of size 144.

3. A major American pharmaceutical company has randomly sampled 14 customers who have used one of their new drugs for two months. There is concern that the drug may elevate the user's heart rate. The heart rates of the users were measured and produced a mean heart rate of 67 and a sample standard deviation of 14.53. Based on this information, develop a 99% confidence interval for the true mean heart rate.

ANSWER: The average heart rate of the study participants is between 55.3035 to 78.6965 at a confidence level of 99% and a sample of size 14.

4. A random sample of 32 shipments of stick-on labels revealed a sample mean order size of 24,520. Assume the population standard deviation is 17,541.81.
 - a. Construct a 99% confidence interval for the true mean order size.

ANSWER: The average order size of stick-on labels is between 16,531.8673 to 32,508.1327 at a confidence level of 99% and a sample of size 32.

- b. How could the confidence interval be made narrower?

ANSWER: Reduce the confidence level.

5. A random sample of 54 pharmacy customers showed the waiting times, in minutes, had a sample mean of 19.875 minutes. Assume the population standard deviation is 3.649. Based on this information, develop a 90% confidence interval for the true mean wait time.

ANSWER: The average amount of time customers spend waiting at the pharmacy is between 19.0581 to 20.6919 minutes at a confidence level of 90% and a sample of size 54.

6. Last year, a study showed that the average ATM cash withdrawal took 65 seconds with a standard deviation of 10 seconds. The study is to be repeated this year. How large a sample size would be needed to estimate this year's mean with 99% confidence and an error of 4 seconds or less?

ANSWER: A sample size of 42 is needed to limit the margin of error to 4 seconds or less at a 99% confidence level.

7. The NPP Company wants to estimate the average number of minutes its customers spend on long-distance calls per month. The company wants the estimate made with 90% confidence and a margin of error of no more than 5 minutes. With a standard deviation of 21 minutes per month, what should the sample size be?

ANSWER: A sample size of 48 is needed to limit the margin of error to 5 minutes or less at a 90% confidence level.

8. It is known that the population variance is 1764. With a 0.95 probability, what is the sample size that needs to be taken if the desired margin of error is 8 or less?

ANSWER: A sample size of 106 is needed to limit the margin of error to 8 or less at a 95% confidence level.

9. The monthly advertising expenditure of Discount Hardware Store is normally distributed with a standard deviation of \$100. If a sample of 30 randomly selected months yields a mean advertising expenditure of \$380 monthly, what is the 90% confidence interval for the mean of the store's monthly advertising expenditure?

ANSWER: The mean advertising expenditure per month is between \$349.9665 to \$410.0335 at a confidence level of 90% and a sample of size 30.

10. A quality control engineer is concerned about the breaking strength of a metal wire manufactured to stringent specifications. A sample of size 32 is randomly obtained and the breaking strengths are recorded. The breaking strength is considered to be normally distributed with a standard deviation of 2.75 and a mean of 22.375 psi. Find the 95% confidence interval for the mean breaking strength of the wire.

ANSWER: The mean breaking strength of the metal wire is between 21.4222 to 23.3278 psi at a confidence level of 95% and a sample of size 32.

11. The manager of a gift shop would like to estimate the average retail price of a particular greeting card by its competitors. A random sample of 40 retail stores in a 100-mile radius of the store was selected. The sample mean was \$2.05 and the standard deviation was \$0.40. Find the 99% confidence interval for the mean price of the greeting card.

ANSWER: The mean retail greeting card price is between \$1.8871 to \$2.2129 at a confidence level of 99% and a sample of size 40.

12. Assume that a Canadian plant manager wished to determine an estimate of the mean idle times for the company's fleet of delivery trucks. Idle times from a random sample of size 51 were recorded. The sample mean was 11.5 minutes, and the standard deviation was 5.3 minutes. Find the 90% confidence interval on the mean idle time for the trucks.

ANSWER: The mean idle time for the fleet trucks is between 10.2792 to 12.7208 minutes at a confidence level of 90% and a sample of size 51.

13. Security Savings and Loan Association's manager would like to estimate the mean deposit by a customer into a savings account to within \$500. If the deposits into savings accounts are considered to be normally distributed with a standard deviation of \$1250, what sample size would be necessary to be 90% percent confident?

ANSWER: A sample size of 17 is needed to limit the margin of error of savings account deposits to \$500 or less at a 90% confidence level.

14. The Chamber of Commerce of Tampa, Florida, would like to estimate the mean amount of money spent by a tourist to within \$100 with a 95% confidence. If the amount of money spent by tourists is considered normally distributed with a standard deviation of \$200, what sample size would be necessary for the Chamber of Commerce to meet their objective in estimating this mean amount?

ANSWER: A sample size of 16 is needed to limit the margin of error of tourist spending to \$100 or less at a 95% confidence level.

15. Suppose the National Homeowners Association wants to estimate the current average mortgage interest rate. The Association randomly selects 48 national mortgage lenders and surveys them on their mortgage rates. The survey results in a sample mean of 7.68, with a standard deviation of 0.28. Determine the 90% confidence interval for the national mortgage rate.

ANSWER: The mean mortgage interest rate is between 7.6135 to 7.7465 percent at a confidence level of 90% and a sample of size 48.

16. Some fast food chains have been offering lower-priced combination meals in an effort to attract budget-conscious customers. Suppose the chain wants to estimate the average amount spent on a meal at their restaurant. An analyst gathers the amount spent by 38 randomly selected customers. Construct a 99% confidence interval if the sample mean is found to be 5.334 and the standard deviation is found to be 2.0162.

ANSWER: The mean amount spent a fast food chains is between \$4.4915 to \$6.1765 at a confidence level of 99% and a sample of size 38.

17. The movie Harry Potter and the Sorcerer's Stone shattered the box office debut record. A sample of 29 movie theaters showed that the mean three-day weekend gross was \$25,467 per theater. The standard deviation was \$4980. What is the 90% confidence interval for the population mean weekend gross per theater?

ANSWER: The population mean weekend gross per theater is between \$23,893.9785 to \$27,040.0215 at a confidence level of 90% and a sample of size 29.

18. Mileage tests are conducted for a particular model of automobile. Assume that the mileage tests on a sample of 12 cars yielded a sample mean of 24.8 miles per gallon and a standard deviation of 2.6 miles per gallon. Develop a 99% confidence interval for the population mean miles per gallon estimate.

ANSWER: The population mean miles per gallon is between 22.4688 to 27.1312 mpg at a confidence level of 99% and a sample of size 12.

19. The manager of a gift shop would like to estimate the average retail price of a particular greeting card by its competitors. A random sample of 25 retail stores in a 100-mile radius of the store was selected. The sample mean was \$2.35 and the standard deviation was \$0.45. Find the 95% confidence interval for the mean price of the greeting card.

ANSWER: The mean retail greeting card price is between \$2.1642 to \$2.5358 at a confidence level of 95% and a sample of size 25.