More Chapter 8 and 9 Practice Problems

CHAPTER 8

1. Drugs R Us operates retail pharmacies in 10 states. A recent audit selected a random sample of 300 prescriptions issued throughout the system. The reason for the audit was to estimate the average dollar value of all prescriptions issued by the company. The sample mean was found to be $14.23 and the sample standard deviation was found to be 3.01. Calculate the 90% confidence interval estimate for the true average sales value for prescriptions issued by the company.
    ANSWER: The mean value for prescriptions is between $13.9441 to $14.5159 per prescription at a confidence level of 90% and a sample of size 300.

2. State Pizza delivers pizzas throughout its local market area at no charge to the customer. However, customers often tip the driver. The owner is interested in estimating the mean tip income per delivery. To do this, she selects a sample of 12 delivers and calculates the sample mean to be $1.875 and the sample standard deviation to be $0.7347. Develop a 99% confidence interval for the true mean tip amount.
    ANSWER: The mean tip amount is between $1.2162 to $2.5338 at a confidence level of 99% and a sample of size 12.

3. Even before the record gas prices during the summer of 2008, a survey showed that 80% of SUV owners were considering purchasing a more fuel efficient car. A random sample of 91 SUV owners was selected and the owners were asked to report their highway miles per gallon received from their SUV. The sample data produced a sample mean of 15.4 miles per gallon and a standard deviation of 6.3 miles per gallon. Based on the sample data, calculate the 95% confidence interval for the true SUV highway miles per gallon.
    ANSWER: The mean highway miles per gallon is between 14.1056 to 16.6944 at a confidence level of 95% and a sample of size 91.

4. A production process that fills 12-ounce cereal boxes is known to have a population standard deviation of 0.09 ounces. A consumer protection agency would like to estimate the mean cereal box fill rate with a 90 percent confidence level and a margin of error of 0.01 ounces. Calculate the required sample size needed to meet those objectives.
    ANSWER: A sample of size 220 is needed to limit the margin on error to 0.01 ounces **with a 90% level of confidence.**

5. A national phone company wants to estimate the average number of minutes its customers spend on long-distance calls per month. The population standard deviation is thought to be 14 minutes. The company wants the estimate made with a 99% confidence interval and a margin of error of no more than 5 minutes. What is the sample size that the company should take?
    ANSWER: **A sample of size 53 is needed to limit the margin on error to 5 minutes with a 99% level of confidence.**

6. Film production companies are gravitating toward Eastern Europe where there are film production facilities are less expensive than in Hollywood. A sample of 29 soundstage facilities produced a mean rental price per square meter of $3.77 and a standard deviation of 0.87. Use these statistics to estimate a 95% confidence interval for the true mean rental price per square meter for Eastern European soundstage facilities.
    ANSWER: **The mean soundstage facilities rental price per square meter is between $3.4391 to $4.1009 at a confidence level of 95% and a sample of size 29.**

CHAPTER 9

7.   The Peanut Company is a supplier of both salted and unsalted peanuts in 16 ounce bags. The company's filling process goal is to achieve an average fill amount of 16 ounces per bag. A recent sample of 33 bags produced a sample mean of 15.8 ounces and a standard deviation of 0.6 ounces. Using a 1% level of significance and the p-value method, conduct a hypothesis test.
ANSWER: **Ho: μ = 16**
                Ha: μ ≠ 16

Fail to Reject Ho: The data appears to support that the goal of a mean of 16 ounces per bag of peanuts is being achieved based on a sample of 33 and a 1% level of significance.

8.   A national country club does periodic studies on issues important to its membership. The organization recently reported that the average initiation fee was less than $31,912. A recent sample of 121 members produced a sample mean initiation fee of $31,258 with a standard deviation of $4,199.80. Based on the sample information, conduct a hypothesis test using the critical value method and a 5% level of significance.
ANSWER: **Ho: μ ≤ 31,912**
                Ha: μ > 31,912

Reject Ho: The data does not appear to support that the mean initiation fee is less than $31,912 based on a sample of size 121 and at a 5% level of significance.

9.   Tool workers are subject to work-related injuries. One disorder, caused by strains to the hands and wrists, is called carpal tunnel syndrome. It strikes as many as 23,000 workers per year. The U.S. Labor Department estimates that the average cost of this disorder to employers and insurers is more than $30,000 per injured worker. A recent sample of 69 injured workers produced a mean cost of $30,489 per worker and a standard deviation of $9,000. Using the confidence interval method and a 10% level of significance, conduct a hypothesis test on the data.
ANSWER: **Ho: μ ≤ 30,000**
                Ha: μ > 30,000

Fail to Reject Ho: The data appears to support that the mean cost to employers and insurers is more than $30,000 based on a sample of size 69 and at a 10% level of significance.

10.   The average cost of a one-bedroom apartment in Corpus Christ is thought to be less than $550 per month. A recent sample of 99 one-bedroom apartments was used to calculate a mean rent of $549 with a standard deviation of $99. Using the p-value method and a 1% level of significance, conduct a hypothesis test on the data.
ANSWER: **Ho: μ ≥ 550**
                Ha: μ < 550

Fail to Reject Ho: The data appears to support that the mean rent is less than $550 based on a sample of size 99 and at a 1% level of significance.