

E Chapter 7 Exercises

Sampling Distributions and Probability

Answer each question.

1. The mean lifetime of laptop computers produced by one company is 4.6 years with a standard deviation of 1.1 years. Consider random samples of 55 laptop computers. What is the standard deviation of the sampling distribution of the sample means?
2. Suppose that for 18-to-25-year-olds, the mean number of football games watched each football season is 19.0 games with a standard deviation of 3.7 games. If 31 randomly selected people in this age range are surveyed, what is the probability that the mean number of football games watched by this group is no more than 17 games per season?
3. In one city, 83% of eligible voters are registered to vote. If 425 randomly selected eligible voters are surveyed, what is the probability that at least 82% are registered to vote?
4. A local fast-food restaurant reports that the mean number of hamburgers it sells per day is 235.0 with a standard deviation of 11.3 hamburgers. Consider a random sample of 31 days. What is the probability that the mean number of hamburgers sold per day for the sample will differ from the population mean by more than 3 hamburgers?
5. The mean size of candy bars from one candy maker is 39.0 grams with a standard deviation of 2.3 grams. If you produce a sampling distribution of sample means using samples of size 40 from the candy production line, what would be the mean of the sampling distribution?
6. The mean blade length of a rapier, which is a fencing sword, is 90.0 cm with a standard deviation of 4.2 cm. If 38 rapiers are randomly sampled, what is the probability that their mean blade length is less than 88 cm?
7. The mean length of an adult blue whale is 30.0 meters with a standard deviation of 5.7 meters. If a random sample of 31 whales is taken, what is the probability that their mean length differs from the population mean by less than 2 meters?
8. Suppose that, for a particular make and model of car, the mean sale price for car dealerships nationwide is \$24,560 with a standard deviation of \$390. What is the probability that the sale price for this car at the car dealership in your area will be no more than \$24,000? Assume that the car prices are normally distributed.
9. One brand of light bulbs has a mean lifetime of 400 hours with a standard deviation of 28 hours. What is the probability that the lifetime of one randomly chosen bulb will differ from the mean by over 50 hours? Assume that the population is normally distributed.
10. At one regional grocery store chain, a customer spends an average of \$7.29 on produce in each visit with a standard deviation of \$2.33. Find the probability that the mean amount spent on produce per visit for 55 randomly selected shoppers will be less than \$7.
11. At a local elementary school, students miss a mean of 4.1 days of school each year with a standard deviation of 1.1 days. What is the probability that the mean number of days missed for a random sample of 30 students will be no more than 3.5?
12. At one theater, moviegoers spend a mean of \$6.32 on refreshments with a standard deviation of \$2.55. What is the probability that the mean amount spent on refreshments by a random sample of 50 moviegoers will be between \$6 and \$7?
13. At a local accounting firm, the mean fee for completing an individual's tax return is \$225 with a standard deviation of \$28. Consider a random sample of 33 individual tax returns from this firm. What is the probability that the mean amount billed for the sample differs from the population mean by more than \$5?

14. At one supermarket, patrons purchase a mean of 17.0 items each visit with a standard deviation of 8.2 items. Suppose that 53 customers are randomly selected. What is the probability that the mean number of items purchased by customers in the sample differs from the population mean by less than 2 items?
15. Salaries of employees at a large factory are normally distributed with a mean of \$27,500 and a standard deviation of \$2900. Consider the mean salary of a group of 8 employees and the mean salary of a group of 15 employees. Which group's mean would you expect to be closer to \$27,500?
16. A study of Transatlantic flights revealed an average cruising altitude of 37,500 feet. Consider the mean cruising altitude of a group of 12 randomly selected flights compared to the mean cruising altitude of 45 randomly selected flights. Which group's mean cruising altitude would you expect to be closer to 37,500?