

Chapter 7

Sampling Distributions

Multiple Choice

1. What is it called when all the items in a population have a chance of being selected in a sample?
 - A) Random sampling
 - B) z-score
 - C) Sampling error
 - D) Nonprobability sampling

2. What is the difference between a sample mean and the population mean called?
 - A) Standard error of the mean
 - B) Sampling error
 - C) Interval estimate
 - D) Point estimate

3. What sample statistic is used to estimate a population parameter?
 - A) Parameter
 - B) Sampling error
 - C) Point estimate
 - D) Interval estimate

5. All possible samples of size n are selected from a population and the mean of each sample is determined. What is the mean of the sample means?
 - A) Exactly the same as the population mean
 - B) Larger than the population mean
 - C) Smaller than the population mean
 - D) Cannot be estimated in advance

7. Based on the central limit theorem, the size of the sampling error is
 - A) Directly related to the sample size, i.e., the larger the sample size the larger the sampling error.
 - B) Directly related to the population mean, i.e., the larger the mean, the larger the sampling error
 - C) Inversely related to the sample size, i.e., the larger the sample size the smaller the sampling error.
 - D) Inversely related to the population standard deviation, i.e., the smaller the standard deviation, the larger the sampling error.

8. For a distribution of sample means constructed by sampling 5 items from a population of 15,
 - A) the sample size is 15
 - B) there will be 3003 possible sample means
 - C) the mean of the sample means will be 3
 - D) the standard error will be 1

9. As the size of the sample increases, what happens to the shape of the sampling means?
 - A) Cannot be predicted in advance
 - B) Approaches a normal distribution
 - C) Positively skewed
 - D) Negatively skewed

11. An experiment involves selecting a random sample of 256 middle managers at random for study. One item of interest is their mean annual income. The sample mean is computed to be \$35,420 and the sample standard deviation is \$2,050. What is the standard error of the mean?
- A) \$128.125
 B) \$138.36
 C) \$2,050
 D) \$8.01
12. The wildlife department has been feeding a special food to rainbow trout fingerlings in a pond. A sample of the weights of 40 trout revealed that the mean weight is 402.7 grams and the standard deviation 8.8 grams. What is the probability that the mean weight for a sample of 40 trout exceeds 405.5 grams?
- A) 0.3783
 B) 0.0228
 C) 1.0
 D) 0.5
13. Suppose a research firm conducted a survey to determine the average amount of money steady smokers spend on cigarettes during a week. A sample of 100 steady smokers revealed that the sample mean is \$20 and the sample standard deviation is \$5. What is the probability that a sample of 100 steady smokers spend between \$19 and \$21?
- A) 0.4772
 B) 0.0228
 C) 0.9544
 D) \$20
14. The mean weight of trucks traveling on a particular section of I-475 is not known. A state highway inspector needs an estimate of the mean. He selects a random sample of 49 trucks passing the weighing station and finds the mean is 15.8 tons, with a standard deviation of the sample of 4.2 tons. What is probability that a truck will weigh less than 14.3 tons?
- A) 0.0062 B) 0.3632 C) 0.1368 D) 0.4938
15. Which of the following is the standard error of the mean?
- A) σ
 B) x/n
 C) $\frac{\sigma}{\sqrt{n}}$
 D) s
16. Mileage tests were conducted on a randomly selected sample of 100 newly developed automobile tires. The average tread wear was found to be 50,000 miles with a standard deviation of 3,500 miles. What is the best estimate of the average tread life in miles for the entire population of these tires?
- A) 50,000
 B) 3,500
 C) (50,000/100)
 D) (3,500/100)
17. The mean of all possible sample means is equal to the
- A) population variance.
 B) σ^2/n .

- C) sample variance.
- D) population mean.

18. For a population that is not normally distributed, the distribution of the sample means will
- A) be negatively skewed.
 - B) approach the normal distribution.
 - C) be positively skewed.
 - D) take the same shape as the population.

Use the following to answer questions 19-22:

An accounting firm is planning for the next tax preparation season. From last year's returns, the firm collects a systematic random sample of 100 filings. The 100 filings showed an average preparation time of 90 minutes with a standard deviation of 140 minutes.

19. What assumptions do you need to make about the shape of the population distribution of all possible tax preparation times to make inferences about the average time to complete a tax form?
- A) The population distribution is skewed to the right.
 - B) The population distribution is skewed to the left.
 - C) The population distribution is normal.
 - D) The shape of the population distribution does not matter.
20. What is the standard error of the mean?
- A) 14 minutes
 - B) 140 minutes
 - C) 1.4 minutes
 - D) 90 minutes
21. What is the probability that the mean completion time will be more than 120 minutes?
- A) Approximately zero
 - B) 0.0832
 - C) 0.4168
 - D) 0.0162
22. What is the probability that the mean completion time is between 1 and 2 hours, i.e., 60 and 120 minutes?
- A) Approximately 1.
 - B) 0.1664
 - C) 0.8336
 - D) 0.9676

Use the following to answer questions 23-26:

A group of statistics students decided to conduct a survey at their university to find the average (mean) amount of time students spend studying per week. Based on a simple random sample, they surveyed 144 students. The statistics showed that students studied an average of 20 hours per week with a standard deviation of 10 hours.

23. What is the standard error of the mean?
- A) 0.83
 - B) 10

C) 0.5

D) 2

24. What is the probability that a sample mean would exceed 20 hours per week?

A) 1.0

B) 0.5

C) 1.96

D) Cannot be calculated based on the given information.

25. What is the probability of finding a sample mean less than 18 hours?

A) 0.4820

B) 0.4920

C) 0.0080

D) 0.0180

26. What is the probability that average student study time is between 18 and 22 hours?

A) 0.9640

B) 0.0160

C) 0.0360

D) 0.9840