PDF for Probability & Statistics MCQS

* A point estimate is a single value estimate for a population parameter.
* An interval estimate is an interval, or range of values, used to estimate a population parameter.
* The level of confidence c is the probability that the interval estimate contains the population parameter.
* The difference between the point estimate and the actual population parameter value is called the sampling error.
* The degrees of freedom are the number of free choices left after a sample statistic such as is calculated.
* A continuous random variable can assume any value in an interval on the real line or in a collection of intervals.
* A random variable is uniformly distributed whenever the probability is proportional to the interval’s length.
* f (x) = 1/(b – a) for a < x < b expected value E(x) = (a + b)/2 Var (x) = (b - a)2/12
* A property of the exponential distribution is that the mean and standard deviation are equal.
* A sampling distribution is the distribution of statistics that would be produced in repeated random sampling (with replacement) from the same population.

Basic Level:

In statistics, what does "sampling" refer to?

A) Collecting data from the entire population

B) Analyzing data using statistical techniques

C) Selecting a subset of individuals from a population for analysis (C)

D) Predicting future trends based on historical data

Which of the following is NOT a characteristic of a good sampling distribution?

A) Unbiasedness

B) Variability

C) Consistency

D) Stratification

The mean of a sampling distribution is also known as:

A) Standard deviation

B) Median

C) Expected value

D) Mode

The Central Limit Theorem states that, for large sample sizes, the sampling distribution of the mean will be:

A) Positively skewed

B) Normally distributed (C)

C) Negatively skewed

D) Uniformly distributed

What is the standard deviation of a sampling distribution called?

A) Population standard deviation

B) Sample standard deviation

C) Central deviation

D) Standard error (C)

Intermediate Level:

6. As the sample size increases, the standard deviation of the sampling distribution of the mean:

A) Increases

B) Decreases (C)

C) Remains the same

D) Depends on the population size

The standard deviation of a sampling distribution is inversely proportional to the:

A) Population size

B) Sample size (C)

C) Population mean

D) Confidence level

Which of the following sampling methods is likely to result in the most representative sample?

A) Convenience sampling

B) Stratified sampling

C) Snowball sampling

D) Quota sampling

What is the shape of the sampling distribution of the proportion?

A) Skewed left

B) Skewed right

C) Uniform

D) Approximately normal (C)

Which statement about the standard error is correct?

A) It measures the spread of the population.

B) It is always larger than the sample standard deviation.

C) It decreases with an increase in the sample size. (C)

D) It is unaffected by the variability of the population.

Advanced Level:

11. A random sample of 100 people was taken from a large population. What is the shape of the sampling distribution of the sample mean?

A) Normally distributed (C)

B) Skewed left

C) Skewed right

D) Cannot be determined without additional information

The standard error of the sample mean is equal to the:

A) Population mean

B) Sample mean

C) Population standard deviation divided by the square root of the sample size (C)

D) Sample standard deviation divided by the square root of the population size

A confidence interval provides an estimate of:

A) The population mean

B) The sample mean

C) The variability in the population

D) The range within which the population parameter is likely to fall (C)

The margin of error in a confidence interval depends on:

A) The sample size and confidence level (C)

B) The population mean and standard deviation

C) The sample mean and standard deviation

D) The variability in the population

Which of the following is an example of a non-sampling error in sampling distributions?

A) Sampling bias

B) Selection bias

C) Measurement error (C)

D) Non-response bias

The sampling distribution of the difference between two sample means is approximately normal if:

A) Both samples are normally distributed (C)

B) Both samples have the same size

C) Both samples are drawn from the same population

D) The population variances are equal

Which of the following is NOT an assumption of the Central Limit Theorem?

A) The sample size is large enough

B) The observations in the sample are independent (C)

C) The population is normally distributed

D) The sampling is done without replacement

What does the term "sampling error" refer to?

A) Errors made during the sampling process

B) Errors made during data analysis

C) Differences between sample statistics and population parameters (C)

D) Errors made by respondents during data collection

A 95% confidence interval for a population mean is calculated as the sample mean plus/minus:

A) The standard deviation

B) The standard error multiplied by 1.96 (C)

C) The margin of error

D) The z-score

Which statistical test is appropriate for comparing the means of two independent samples?

A) Paired t-test

B) Chi-square test

C) Analysis of variance (ANOVA)

D) Independent samples t-test (D)

The standard deviation of the sampling distribution of the proportion is calculated using the formula:

A) Sample size multiplied by the population proportion

B) Sample size divided by the population proportion

C) Square root of the population proportion multiplied by (1 - population proportion) divided by the sample size (C)

D) Square root of the population proportion divided by the sample size

Which of the following statements about the Central Limit Theorem is true?

A) It applies only to normally distributed populations

B) It guarantees that the sample mean will always be equal to the population mean

C) It states that the sampling distribution of the mean will be approximately normal regardless of the shape of the population (C)

D) It requires a small sample size to be valid

A confidence interval provides a range of values within which:

A) The sample mean is likely to fall

B) The population mean is likely to fall (C)

C) The standard error is likely to fall

D) The sampling distribution is likely to fall

The standard deviation of a sampling distribution of sample means is called the:

A) Standard deviation of the population

B) Standard error of the population

C) Standard deviation of the sample (C)

D) Standard error of the sample

What happens to the width of a confidence interval if the confidence level increases?

A) It becomes narrower

B) It becomes wider (C)

C) It remains unchanged

D) It depends on the sample size

The shape of the sampling distribution of the difference between two sample means is approximately normal if:

A) Both populations are normally distributed

B) Both sample sizes are equal

C) Both populations have the same variance

D) All of the above (D)

Which of the following statements about the standard error is true?

A) It measures the spread of the population

B) It is always smaller than the sample standard deviation

C) It increases with an increase in the sample size (C)

D) It is unaffected by the variability of the population

A sample of 100 students is taken from a large population. What is the shape of the sampling distribution of the sample proportion?

A) Normally distributed (C)

B) Skewed left

C) Skewed right

D) Cannot be determined without additional information

In hypothesis testing, the sampling distribution used to calculate the p-value depends on:

A) The sample size

B) The sample mean

C) The alternative hypothesis

D) The null hypothesis (C)

Which of the following sampling methods provides the most representative sample?

A) Cluster sampling

B) Convenience sampling

C) Simple random sampling (C)

D) Systematic sampling

A 90% confidence interval for a population mean is calculated as the sample mean plus/minus:

A) The standard deviation multiplied by 1.645

B) The standard error multiplied by 1.96

C) The margin of error multiplied by 1.96

D) The standard error multiplied by 1.645 (C)

The formula for the standard error of the difference between two sample means is:

A) (Standard deviation of sample 1) / (Sample size of sample 1)

B) (Standard deviation of sample 2) / (Sample size of sample 2)

C) Square root of [(Variance of sample 1) / (Sample size of sample 1) + (Variance of sample 2) / (Sample size of sample 2)] (C)

D) (Standard deviation of sample 1) / (Standard deviation of sample 2)

Which of the following sampling methods is commonly used in opinion polls and surveys?

A) Stratified sampling

B) Cluster sampling

C) Convenience sampling

D) Quota sampling (D)

The margin of error in a confidence interval depends on:

A) The sample size and confidence level (C)

B) The population mean and standard deviation

C) The sample mean and standard deviation

D) The variability in the population

Which statistical test is appropriate for comparing the means of three or more independent groups?

A) Paired t-test

B) Chi-square test

C) Analysis of variance (ANOVA) (C)

D) Independent samples t-test

Which of the following factors affects the width of a confidence interval?

A) Sample size (C)

B) Population size

C) Population mean

D) Confidence level

Which of the following sampling methods involves dividing the population into subgroups before taking a random sample from each subgroup?

A) Cluster sampling

B) Stratified sampling (C)

C) Simple random sampling

D) Systematic sampling

A sampling distribution represents the distribution of:

A) Sample values

B) Population values

C) Sampling statistics (C)

D) Sample means

What does the term "margin of error" represent in a confidence interval?

A) The maximum error allowed in the estimate

B) The minimum error allowed in the estimate

C) The range within which the true population parameter is likely to fall (C)

D) The range within which the sample mean is likely to fall

The standard deviation of a sampling distribution of differences between two proportions is calculated using the formula:

A) Square root of (p1 \* (1 - p1) / n1 + p2 \* (1 - p2) / n2)

B) Square root of (p1 / n1 + p2 / n2)

C) Square root of [(p1 \* (1 - p1)) / n1 + (p2 \* (1 - p2)) / n2] (C)

D) Square root of [(p1 / n1) + (p2 / n2)]

Note: The (C) at the end of each question represents the correct option.