DESCRIPTIVE STATISTICS AND INTRODUCTION TO PROBABILITY PRACTICE TEST (SAMPLE)

STUDY GUIDE

SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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Introduction

Preparing for a certification exam can feel overwhelming, but with the right tools, it becomes an opportunity to build confidence, sharpen your skills, and move one step closer to your goals. At Examzify, we believe that effective exam preparation isn't just about memorization, it's about understanding the material, identifying knowledge gaps, and building the test-taking strategies that lead to success.

This guide was designed to help you do exactly that.

Whether you're preparing for a licensing exam, professional certification, or entry-level qualification, this book offers structured practice to reinforce key concepts. You'll find a wide range of multiple-choice questions, each followed by clear explanations to help you understand not just the right answer, but why it's correct.

The content in this guide is based on real-world exam objectives and aligned with the types of questions and topics commonly found on official tests. It's ideal for learners who want to:

- Practice answering questions under realistic conditions,
- Improve accuracy and speed,
- Review explanations to strengthen weak areas, and
- Approach the exam with greater confidence.

We recommend using this book not as a stand-alone study tool, but alongside other resources like flashcards, textbooks, or hands-on training. For best results, we recommend working through each question, reflecting on the explanation provided, and revisiting the topics that challenge you most.

Remember: successful test preparation isn't about getting every question right the first time, it's about learning from your mistakes and improving over time. Stay focused, trust the process, and know that every page you turn brings you closer to success.

Let's begin.

How to Use This Guide

This guide is designed to help you study more effectively and approach your exam with confidence. Whether you're reviewing for the first time or doing a final refresh, here's how to get the most out of your Examzify study guide:

1. Start with a Diagnostic Review

Skim through the questions to get a sense of what you know and what you need to focus on. Your goal is to identify knowledge gaps early.

2. Study in Short, Focused Sessions

Break your study time into manageable blocks (e.g. 30 – 45 minutes). Review a handful of questions, reflect on the explanations.

3. Learn from the Explanations

After answering a question, always read the explanation, even if you got it right. It reinforces key points, corrects misunderstandings, and teaches subtle distinctions between similar answers.

4. Track Your Progress

Use bookmarks or notes (if reading digitally) to mark difficult questions. Revisit these regularly and track improvements over time.

5. Simulate the Real Exam

Once you're comfortable, try taking a full set of questions without pausing. Set a timer and simulate test-day conditions to build confidence and time management skills.

6. Repeat and Review

Don't just study once, repetition builds retention. Re-attempt questions after a few days and revisit explanations to reinforce learning. Pair this guide with other Examzify tools like flashcards, and digital practice tests to strengthen your preparation across formats.

There's no single right way to study, but consistent, thoughtful effort always wins. Use this guide flexibly, adapt the tips above to fit your pace and learning style. You've got this!

Questions

1. **All possible results or outcomes of a study or experiment define which concept?**

   A. Theoretical Probability

   B. Sample Space

   C. Conditional Probability

   D. Joint Probability

2. **For a large sample from a population with proportion p, the distribution of p-hat is approximately Normal with mean and variance given. Which is the correct pair for the mean and variance?**

   A. Mean = p; Variance = p(1-p)

   B. Mean = p; Variance = p(1-p)/n

   C. Mean = np; Variance = p(1-p)/n

   D. Mean = p/n; Variance = p(1-p)/n^2

3. **In sampling without replacement, what distribution describes the number of successes in a fixed-size sample?**

   A. Hypergeometric distribution; P(X=k) = [C(K, k) C(N − K, n − k)] / C(N, n)

   B. Binomial distribution; P(X=k) = C(n, k) p^k (1−p)^{n−k}

   C. Poisson distribution; P(X=k) = e^{−λ} λ^k / k!

   D. Geometric distribution; P(X=k) = (1−p)^{k−1} p

4. **In a binomial distribution, which parameter pair defines its shape and mean?**

   A. mu and sigma; mean mu

   B. lambda and p

   C. n and p; mean np

   D. n and p; mean p

5. **P(A^c) is what in terms of P(A)?**

   A. P(A^c) = 1 − P(A)

   B. P(A^c) = P(A)

   C. P(A^c) = P(A) + P(A^c)

   D. P(A^c) = 0

6. In a right-skewed distribution, which statement is true?

A. Median > Mean > Mode

B. Mean > Mode > Median

C. Mean > Median > Mode

D. Mode > Mean > Median

7. What term describes a descriptive measure computed from a sample?

A. Descriptive measure

B. Statistic

C. Parameter

D. Measures of central tendency

8. Which statistic is most robust to extreme outliers?

A. Mean

B. Median

C. Mode

D. Range

9. What is a cumulative distribution function (CDF)?

A. $F(x) = P(X \leq x)$; nondecreasing, right-continuous, ranges from 0 to 1.

B. $F(x) = P(X \leq x)$ for discrete X only.

C. F(x) describes the probability density.

D. F(x) is the inverse of the PDF.

10. According to the empirical rule for a normal distribution, approximately what percentage lies within two standard deviations of the mean?

A. About 68%

B. About 75%

C. About 99.7%

D. About 95%

Answers

1. B
2. B
3. A
4. C
5. A
6. C
7. B
8. B
9. A
10. D

Explanations

1. All possible results or outcomes of a study or experiment define which concept?

A. Theoretical Probability

B. Sample Space

C. Conditional Probability

D. Joint Probability

The set of all possible results of an experiment is called the sample space. This is the complete universe from which probabilities are drawn and to which every outcome belongs. For example, rolling a six-sided die has a sample space of {1, 2, 3, 4, 5, 6}; flipping a coin has a sample space of {Heads, Tails}. Events are subsets of this space, like the event "an even number" which corresponds to {2, 4, 6}. The idea here is that probabilities are assigned to these events within the framework of the sample space. The other terms describe different ways we work with these outcomes: theoretical probability is the method or model used to calculate probabilities, conditional probability is the probability of an outcome given that another event has occurred, and joint probability is the probability of two events happening together. They're all about assigning or relating probabilities, whereas the sample space is about listing all possible outcomes themselves.

2. For a large sample from a population with proportion p, the distribution of p-hat is approximately Normal with mean and variance given. Which is the correct pair for the mean and variance?

A. Mean = p; Variance = p(1-p)

B. Mean = p; Variance = p(1-p)/n

C. Mean = np; Variance = p(1-p)/n

D. Mean = p/n; Variance = p(1-p)/n^2

The sample proportion p-hat is the average of n independent Bernoulli trials with success probability p. Each trial has mean p, so the average has mean p. The variance of a single trial is p(1-p); the variance of the sum of n trials is n p(1-p). Since p-hat is the sum divided by n, its variance is (n p(1-p)) / n^2 = p(1-p)/n. For large n, the Central Limit Theorem makes p-hat approximately Normal with this mean and variance. So the correct pairing is mean p and variance p(1-p)/n. The other options mix up the mean or omit the 1/n scaling, which is why they don't fit.

3. In sampling without replacement, what distribution describes the number of successes in a fixed-size sample?

A. Hypergeometric distribution; P(X=k) = [C(K, k) C(N − K, n − k)] / C(N, n)

B. Binomial distribution; P(X=k) = C(n, k) p^k (1−p)^{n−k}

C. Poisson distribution; P(X=k) = e^{−λ} λ^k / k!

D. Geometric distribution; P(X=k) = (1−p)^{k−1} p

When you draw a fixed number of items from a finite population that has a known number of successes, the number of successes in your sample follows a hypergeometric distribution. The reason is that each draw changes the composition of the population, so the trials are not independent. The probability of getting exactly k successes in the sample is P(X = k) = [C(K, k) C(N − K, n − k)] / C(N, n). This counts the ways to choose k successes from the K available and n − k failures from the N − K non-successes, divided by all possible ways to choose n items from N. This differs from the binomial distribution, which assumes independent trials with a constant success probability on each draw—an assumption that fails here because removing items without replacement updates those probabilities. The Poisson and geometric distributions describe other scenarios (rare events in a large population, or the number of trials until the first success in independent trials, respectively) and don't match the fixed-size, without-replacement setup.

4. In a binomial distribution, which parameter pair defines its shape and mean?

A. mu and sigma; mean mu

B. lambda and p

C. n and p; mean np

D. n and p; mean p

In a binomial distribution, the shape and the location of the center are determined by two parameters: n, the number of trials, and p, the probability of success on each trial. The mean of the distribution is np, so these two parameters together define both how the distribution looks and where its average lies. Other options mix parameters from different distributions or misstate the mean: mu and sigma belong to the normal distribution (mean is mu), lambda is the rate parameter for the Poisson distribution, and having the mean as p ignores the effect of counting up to n trials. Therefore, the pair that defines both the shape and the mean is n and p, with mean np.

5. P(A^c) is what in terms of P(A)?

A. P(A^c) = 1 − P(A)

B. P(A^c) = P(A)

C. P(A^c) = P(A) + P(A^c)

D. P(A^c) = 0

The key idea is that A and its complement A^c partition the whole sample space, so their probabilities add up to 1. Since A^c includes all outcomes where A does not occur, P(A^c) must be 1 minus the probability that A occurs. Therefore, P(A^c) = 1 − P(A). As context, if P(A) is 0.6, then the chance A does not happen is 0.4. The other expressions don't hold in general: P(A^c) = P(A) would only be true in special cases (like P(A) = 0.5), P(A^c) = P(A) + P(A^c) would force P(A) = 0, and P(A^c) = 0 would mean A occurs with probability 1.

6. In a right-skewed distribution, which statement is true?

A. Median > Mean > Mode

B. Mean > Mode > Median

C. Mean > Median > Mode

D. Mode > Mean > Median

In a right-skewed distribution, the tail extends to the right with some unusually large values that pull the average upward. The mean is sensitive to those extreme values, so it ends up larger than the median. The median, being the middle value, is less influenced by a few high outliers, placing it between the mean and the mode. The mode is the most frequent value and, in a positively skewed shape, tends to sit at the lower end, making it the smallest of the three. So the typical order is mean > median > mode, which is why that statement is true.

7. What term describes a descriptive measure computed from a sample?

A. Descriptive measure

B. Statistic

C. Parameter

D. Measures of central tendency

When you summarize the data you collected, if the summary is computed from a sample, that summary is called a statistic. It serves as an estimate of the corresponding value for the whole population, which is called a parameter. For example, the average of your sample (the sample mean) is a statistic, not a parameter. Descriptive measure is a broad phrase for any summary of data, but it doesn't specify the source. A parameter describes the entire population, not just the sample. Measures of central tendency (like the mean or median) are a type of statistic, but not all descriptive measures are central-tendency measures.

8. Which statistic is most robust to extreme outliers?

A. Mean

B. Median

C. Mode

D. Range

The concept here is how a statistic withstands extreme values, or its robustness. The middle value in an ordered data set, the median, is determined by position rather than the actual magnitudes of extreme numbers. So when an extreme outlier appears, it hardly moves the middle position, unless enough outliers shift the central arrangement. For example, with data like 1, 2, 3, 4, 5, 1000, the median is near the center of the bulk (the average of the two middle values), while the mean is pulled up by the single large outlier. The range also inflates because it depends on the smallest and largest values. The mode, being the most frequent value, isn't driven by an outlier in the same way and isn't a reliable reflection of center for skewed data. So the median is the best choice for robustness to extreme outliers.

9. What is a cumulative distribution function (CDF)?

A. $F(x) = P(X \leq x)$; nondecreasing, right-continuous, ranges from 0 to 1.

B. $F(x) = P(X \leq x)$ for discrete X only.

C. F(x) describes the probability density.

D. F(x) is the inverse of the PDF.

The central idea is that a cumulative distribution function tells us the probability that the random variable is at most a given value. It is defined as $F(x) = P(X \leq x)$. This function must be nondecreasing because increasing the threshold x cannot reduce the chance that X falls at or below it. It is right-continuous, meaning it's continuous when approached from the right, though it can have jumps at points where X has positive probability mass. As x goes to very small values, F(x) approaches 0, and as x goes to very large values, F(x) approaches 1. This description fits for any random variable, whether its distribution is discrete, continuous, or mixed. For a discrete X, F has jumps at the possible values, with jump sizes equal to P(X equals that value). For a continuous X with a density, F is smooth and its derivative, where it exists, is the probability density function ($F'(x) = f(x)$). The density and the CDF are related but distinct concepts. The choice states the defining expression and these general properties, making it the best description. The other ideas mix up special cases or confuse the CDF with the density or its inverse, which isn't correct.

10. According to the empirical rule for a normal distribution, approximately what percentage lies within two standard deviations of the mean?

A. About 68%

B. About 75%

C. About 99.7%

D. About 95%

The empirical rule for the normal distribution describes how data are spread around the mean in terms of standard deviations. Roughly speaking, about 68% of observations fall within one standard deviation of the mean, about 95% fall within two standard deviations, and about 99.7% fall within three standard deviations. So, within two standard deviations from the mean, the proportion is about 95%. The remaining 5% lies outside that range, with roughly half in each tail beyond two standard deviations. This rule helps you gauge how concentrated data are around the mean and is a quick check for normal-shaped data.

Next Steps

Congratulations on reaching the final section of this guide. You've taken a meaningful step toward passing your certification exam and advancing your career.

As you continue preparing, remember that consistent practice, review, and self-reflection are key to success. Make time to revisit difficult topics, simulate exam conditions, and track your progress along the way.

If you need help, have suggestions, or want to share feedback, we'd love to hear from you. Reach out to our team at hello@examzify.com.

Or visit your dedicated course page for more study tools and resources:

https://descriptivestatsintrotoprobability.examzify.com

We wish you the very best on your exam journey. You've got this!