Descriptive Statistics and Introduction to Probability Practice Test (Sample)

Study Guide

BY EXAMZIFY

Everything you need from our exam experts!

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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. **Q2 observation position (median) in a sorted data set.**
   - A. n th observation
   - B. 2(n+1)/4 th observation
   - C. (n+1)/4 th observation
   - D. (n+3)/4 th observation

2. **Which statement best describes how the variance of the sample mean relates to sample size?**
   - A. The larger sample size has smaller variance
   - B. The larger sample size has larger variance
   - C. They have the same variance
   - D. It depends on μ

3. **For a Binomial distribution with parameters n and p = 0.5, what are the mean and variance?**
   - A. Mean = n; Variance = n
   - B. Mean = n/2; Variance = n/4
   - C. Mean = 0; Variance = n/8
   - D. Mean = n/4; Variance = n/2

4. **Which statement correctly describes the standard deviation?**
   - A. It is the sum of squared deviations
   - B. It is the square of the variance
   - C. It is the mean of the data
   - D. It is the square root of the variance

5. **Which formula expresses P(A ∪ B) in terms of P(A), P(B), and P(A ∩ B)?**
   - A. P(A) + P(B) - P(A∩B)
   - B. P(A) + P(B)
   - C. P(A)P(B]
   - D. P(A∪B) - P(A∩B)

6. Which statistic is not a measure of spread?

- **A. Variance**
- **B. Mean**
- **C. Standard Deviation**
- **D. Interquartile Range**

7. Which property is shared by both the mean and the median?

- **A. Uniqueness**
- **B. Not affected by extreme values**
- **C. They are both robust to outliers**
- **D. Always equal to the mode**

8. What is the expected value of a discrete uniform distribution on {1,2,3,4}?

- **A. 2.5**
- **B. 2**
- **C. 3**
- **D. 4**

9. What does the Law of Large Numbers state in terms of sample means?

- **A. The sample mean becomes more variable as n grows**
- **B. The sample mean always equals μ for any n**
- **C. As n increases, the sample mean converges to the population mean μ.**
- **D. The sample mean equals the population median**

10. Which statement describes the mean's suitability for distributions

- **A. Better representative for symmetrical distribution**
- **B. Better for skewed distribution**
- **C. Only for categorical data**
- **D. Not defined for continuous data**

Answers

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

Explanations

1. Q2 observation position (median) in a sorted data set.

A. n th observation

B. 2(n+1)/4 th observation

C. (n+1)/4 th observation

D. (n+3)/4 th observation

The median is the middle value in a sorted list, so its position is the central index. For a dataset with n observations, the middle index is (n+1)/2. Writing it as 2(n+1)/4 is just another way to express the same thing, since 2(n+1)/4 simplifies to (n+1)/2. This matches the idea of a central position: when n is odd, it points to the exact middle observation; when n is even, there isn't a single middle observation and the median comes from the two central positions at n/2 and n/2 + 1, with the central region centered around (n+1)/2. The other expressions don't land at the center of the ordered list, so they aren't the median position.

2. Which statement best describes how the variance of the sample mean relates to sample size?

A. The larger sample size has smaller variance

B. The larger sample size has larger variance

C. They have the same variance

D. It depends on μ

Think about how the sample mean behaves across many samples. The spread of those sample means, measured by the variance of $\bar{X}$, shrinks as you increase how many observations you average. If the population has variance σ^2, then Var($\bar{X}$) = σ^2 / n. So doubling the sample size halves the variance, and the standard error is σ / √n. This means the larger the sample, the more precise the estimate of the population mean becomes. Therefore, the statement that a larger sample size has smaller variance is the best description. The other ideas don't fit because variance does not increase with n, it changes (decreases) with n, and it does not depend on the mean μ.

3. For a Binomial distribution with parameters n and p = 0.5, what are the mean and variance?

A. Mean = n; Variance = n

B. Mean = n/2; Variance = n/4

C. Mean = 0; Variance = n/8

D. Mean = n/4; Variance = n/2

In a Binomial(n, p) distribution, the mean (expected value) is np and the variance is np(1 − p). If p = 0.5, the mean becomes n × 0.5 = n/2, and the variance becomes n × 0.5 × 0.5 = n/4. So the distribution has mean n/2 and variance n/4. Why the other options don't fit: a mean of n would require p = 1, which isn't the given p. A zero mean would require p = 0 (or n = 0). A variance of n/2 would imply p(1 − p) = 1/2, which has no real solution for p. A variance of n/8 would imply p(1 − p) = 1/8, which also isn't achieved by p = 0.5.

4. Which statement correctly describes the standard deviation?

A. It is the sum of squared deviations

B. It is the square of the variance

C. It is the mean of the data

D. It is the square root of the variance

The standard deviation measures how spread out the data are around the mean. It is defined as the square root of the variance—the variance being the average of the squared deviations from the mean. Taking the square root brings the measure back to the same units as the data, making it easier to interpret the typical distance from the mean. The sum of squared deviations is part of the variance calculation, but the standard deviation is not simply that sum. The mean describes central location, not spread. Squaring the variance would describe a different quantity with a different interpretation. So the standard deviation is best described as the square root of the variance.

5. Which formula expresses P(A ∪ B) in terms of P(A), P(B), and P(A ∩ B)?

A. P(A) + P(B) - P(A∩B)

B. P(A) + P(B)

C. P(A)P(B]

D. P(A∪B) - P(A∩B)

When two events can both happen, you add their probabilities but you must subtract the overlap because that part gets counted twice. This gives P(A ∪ B) = P(A) + P(B) − P(A ∩ B). It accounts for every outcome that lies in A or in B (or both) exactly once. Adding P(A) and P(B) alone would double-count the overlap. Multiplying probabilities is a rule for independent events, which isn't specified here. Subtracting P(A ∩ B) from P(A ∪ B) isn't a correct way to express the union probability.

6. Which statistic is not a measure of spread?

A. Variance

B. Mean

C. Standard Deviation

D. Interquartile Range

The key idea is understanding what we mean by "spread." Measures of spread describe how far data values are from a central value. Variance and standard deviation quantify that average distance from the mean, while the interquartile range shows the spread of the middle portion of the data. The mean, however, is a measure of center, the typical value around which data cluster, not how far values vary. So the statistic that is not a measure of spread is the mean.

7. **Which property is shared by both the mean and the median?**

   A. Uniqueness

   B. Not affected by extreme values

   C. They are both robust to outliers

   D. Always equal to the mode

Both mean and median produce a single numerical summary for a dataset. For any given data set, there is one mean and one median, so each statistic yields a unique value that summarizes the data. That's why the property they share is their uniqueness: each dataset has exactly one mean and exactly one median. The other statements don't hold for both measures. The mean can be pulled toward extreme values, while the median stays more resistant to outliers. They describe central tendency, but they aren't always equal to the mode.

8. **What is the expected value of a discrete uniform distribution on {1,2,3,4}?**

   A. 2.5

   B. 2

   C. 3

   D. 4

For a discrete uniform distribution, every possible value occurs with the same probability, so the expected value is simply the average of all the possible outcomes. Compute the average of 1, 2, 3, and 4: (1 + 2 + 3 + 4) / 4 = 10 / 4 = 2.5. This result also aligns with the general fact that the mean of a uniform distribution from a to b is (a + b) / 2, here (1 + 4) / 2 = 2.5. The expectation is the long-run average you'd expect if you repeated the experiment many times, and it need not be one of the outcomes.

9. **What does the Law of Large Numbers state in terms of sample means?**

   A. The sample mean becomes more variable as n grows

   B. The sample mean always equals μ for any n

   C. As n increases, the sample mean converges to the population mean μ.

   D. The sample mean equals the population median

The main idea here is that averaging many independent observations reduces randomness and the estimated average gets closer to the true population mean as you collect more data. This is the essence of the Law of Large Numbers: as the sample size grows, the sample mean tends to approach the population mean μ. Intuitively, the spread of the sample mean shrinks with more data—the standard error is $\sigma/\sqrt{n}$—so with large n the average you compute is very likely to be near μ. That's why the correct statement says the sample mean converges to μ as n increases. The other ideas don't fit: the sample mean does not become more variable with more observations; it varies less as n grows, not more. It also doesn't guarantee equality to μ for any finite n, only in the limiting sense as n becomes large. And the mean need not equal the population median unless the distribution is symmetric or has a special relationship between mean and median.

10. Which statement describes the mean's suitability for distributions

A. Better representative for symmetrical distribution

B. Better for skewed distribution

C. Only for categorical data

D. Not defined for continuous data

The mean serves as the balance point of a dataset, so it best represents the center when the distribution is roughly symmetric. In a symmetric shape, values above and below the center offset each other, placing the mean at the true center of the data. When the data are skewed, extreme values in the tail pull the mean toward that tail, making it a less accurate single representative of the typical value; in those cases, the median often provides a better sense of central tendency. The mean requires numerical data, so it isn't appropriate for categorical data, and it is defined for both discrete and continuous numerical data, so saying it's not defined for continuous data isn't correct.

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!