GENERAL

ap stats quiz b chapter 14 answers

Published: September 19, 2026 | Index ID: #-

Introduction

Preparing for the AP Statistics exam can feel like navigating a maze of formulas, graphs, and probability concepts. One of the most effective ways to master the material is by tackling practice quizzes that mirror the structure of the actual test. In particular, the **AP Stats quiz B chapter 14 answers**provide a valuable resource for students who want to verify their understanding of probability distributions, sampling techniques, and hypothesis testing—topics that are essential for achieving a high score.

While the answers alone are useful, this guide goes beyond a simple answer key. It explains the reasoning behind each solution, highlights common pitfalls, and offers strategies to apply the concepts in new contexts. By the end of this article, you'll not only know the correct responses but also understand how to approach similar problems on the exam.

Understanding AP Statistics Chapter 14

Key Concepts Covered

Chapter 14 in the AP Statistics curriculum typically focuses on **probability distributions and their properties**. Students learn how to model real world scenarios using discrete and continuous distributions, compute expected values, variances, and standard deviations, and apply the Central Limit Theorem to approximate probabilities.

Core topics include:

- Discrete random variables (e.g., binomial, Poisson)
- Continuous random variables (e.g., normal, exponential)
- Transformations of random variables
- Sampling distributions and the Central Limit Theorem
- Hypothesis testing for means and proportions using normal approximations

Mastering these concepts is crucial because many questions on the AP exam require quick application of formulas and a solid grasp of underlying principles.

Why Chapter 14 is a Turning Point

Before Chapter 14, students have already dealt with descriptive statistics and basic probability. This chapter introduces the bridge between theoretical probability and the statistical inference methods that dominate the AP exam. It's the point where you start seeing how data can be modeled, how to quantify uncertainty, and how to draw conclusions from sample data.

Quiz B Overview

What to Expect

Quiz B is designed to test students on the application of chapter concepts rather than rote memorization. Typically, it contains a mix of multiple choice questions and short answer items that require calculations or reasoning. The format encourages:

- Rapid identification of the appropriate distribution
- Efficient use of calculators for probability calculations
- Clear justification of statistical conclusions

Because of its emphasis on application, Quiz B serves as an excellent practice tool for exam preparation. By reviewing the **AP Stats quiz B chapter 14 answers**, you can benchmark your performance and identify areas that need more attention.

Answers to AP Stats Quiz B Chapter 14

Question 1: Binomial Probability

Problem:A factory produces light bulbs with a 2% defect rate. If a quality control inspector selects 20 bulbs at random, what is the probability that exactly one bulb is defective?

Answer: 0.1654

Explanation: The scenario follows a binomial distribution with parameters n = 20 and p = 0.02. The probability of exactly k = 1 success is calculated using the binomial formula:

P(X = 1) = C(20,1) * (0.02)^1 * (0.98)^(19) = 20 * 0.02 * 0.98^19 "H 0.1654\\nStudents often misinterpret the “exactly one” part, forgetting to raise the failure probability to the power of 19. Double checking the exponent ensures accuracy.

Question 2: Normal Approximation to Binomial

Problem: In a survey, 60% of 500 respondents support a policy. Use the normal approximation to estimate the probability that at least 320 respondents support it.

Answer: 0.7928

Explanation: The binomial parameters are n = 500, p = 0.60. The mean ;À = np = 300 and variance <; = np(1-p) = 120. Using the normal approximation with continuity correction:

Z = (319.5 - 300) / sqrt(120) "H 1.78\\nP(X "e 320) "H 1 - :b*ƒ* ãs,• "H 0.7928\\nRemember to apply the continuity correction (subtract 0.5) when approximating discrete outcomes.

Question 3: Exponential Distribution

Problem: The time (in minutes) until a randomly selected customer receives a service is exponentially distributed with a mean of 5 minutes. What is the probability that the service time exceeds 8 minutes?

Answer: 0.2231

Explanation: For an exponential distribution with mean ;² »• = 5, the rate ;° = 0.2. The survival function is P(X > x) = e^(-;·,’à Plugging in x = 8:

P(X > 8) = e^(-0.2 * 8) = e^(-1.6) "H 0.2231\\nStudents often confuse the mean with the rate parameter; ensure you invert the mean to obtain ;²à

Question 4: Transforming a Normal Variable

Problem: Let X ~ N(50, 4²). Find the probability that X is between 45 and 55.

Answer: 0.6827

Explanation: Standardize: Z = (X - ;Â’óÃ. For X = 45, Z = (45-50)/4 = -1.25. For X = 55, Z = (55-50)/4 = 1.25. Using

standard normal tables or calculator:

P(-1.25 \\nHowever, the correct probability for a ±1<0 interval is approximately 0.6827. The discrepancy arises because the interval is ±1.25<2À not ±1<2à Re calculation yields 0.7888, so the correct answer is 0.7888. This illustrates the importance of verifying calculations.

Question 5: Sampling Distribution of the Mean

Problem:A population has a mean ;À = 200 and standard deviation <0 = 15. A random sample of 25 observations is drawn. What is the standard error of the sample mean?

Answer: 3

Explanation: Standard error (SE) = <2 ò 7 t(n) = 15 / sqrt(25) = 15 / 5 = 3.

Question 6: Confidence Interval for a Mean

Problem: Using the same population as above, a sample of 25 observations yields a sample mean of 205. Construct a 95% confidence interval for the population mean.

Answer: (201.5, 208.5)

Explanation: For large samples, use z = 1.96. The margin of error (ME) = z * SE = 1.96 * 3 = 5.88. The interval: 205 ± 5.88 !' (199.12, 210.88). However, the provided answer uses t-distribution with df=24: t = 2.064. ME = 2.064 * 3 = 6.192. Interval: 205 ± 6.192 !' (198.808, 211.192). The discrepancy highlights the need to choose the correct critical value based on sample size and known <2à With known <2Â F†R ¢ –çFW val is appropriate.

Question 7: Hypothesis Test for a Mean

Problem:A researcher claims that the average test score of a new curriculum is higher than the national average of 75. A random sample of 30 students yields a mean of 78 with <2 Ò Bà Test the claim at ; Ò ã Rà

Answer: Reject the null hypothesis (p

Explanation: H €: ;Â Ò sRÂ , ;Â â sRà Test statistic: z = (78 - 75) / (4/" 30) = 3 / (0.7303) "H 4.11. The p value is

Question 8: Proportion Test

Problem: In a survey of 200 voters, 120 support candidate A. Test whether the proportion of supporters is greater than 0.5 at ; Ò ã à

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