

# Ap Statistics Quiz B Chapter 6 Answer Key

Ap Statistics Quiz B Chapter 6 Answer Key AP Statistics Quiz B Chapter 6 Answer Key A Deep Dive into Inference for Proportions This blog post aims to provide comprehensive answers and explanations for the AP Statistics Quiz B Chapter 6 which focuses on inference for proportions Well cover key concepts common question types and strategies for tackling these challenging problems AP Statistics Quiz B Chapter 6 Inference Proportions Confidence Intervals Hypothesis Tests OneSample ZTest TwoSample ZTest SuccessFailure Condition Margin of Error P Value Chapter 6 of the AP Statistics curriculum delves into the crucial topic of inference for proportions This chapter builds upon the foundation of sampling distributions and introduces the tools necessary to make meaningful conclusions about population proportions based on sample data Well explore the construction and interpretation of confidence intervals for proportions conduct hypothesis tests to assess claims about population proportions and delve into the nuances of onesample and twosample ztests This blog post will equip you with the knowledge and skills to tackle the AP Statistics Quiz B and excel in this essential statistical concept Analysis of Current Trends The study of inference for proportions is highly relevant in todays datadriven world Businesses use this statistical framework to assess customer satisfaction predict market trends and analyze campaign effectiveness Politicians rely on inference for proportions to gauge public opinion and inform their policies Furthermore understanding this topic empowers individuals to critically analyze statistical claims presented in news articles research papers and marketing materials Discussion of Ethical Considerations The responsible use of inference for proportions is crucial Misinterpretation of data or biased sampling can lead to misleading conclusions Ethical considerations include Transparency Clearly disclosing the methods used to collect data and the assumptions made in the analysis Objectivity Avoiding personal biases and ensuring the data is analyzed objectively Contextualization Presenting findings in a way that accurately reflects the complexity of the situation and avoids oversimplification 2 Misuse of Results Understanding the limitations of statistical inference and avoiding using results to manipulate or exploit individuals or groups Detailed Answer Key for AP Statistics Quiz B

Chapter 6 Note This is a general guide and specific questions and their answers may vary depending on the specific edition and form of the AP Statistics textbook. It is recommended to consult your textbook and any provided answer key for the most accurate information.

**Section 1 Confidence Intervals for Proportions**

**Key Concepts**

- Confidence Level: The probability that the true population proportion falls within the constructed confidence interval.
- Margin of Error: The maximum likely difference between the sample proportion and the true population proportion.
- SuccessFailure Condition: Ensures that the sampling distribution of the sample proportion is approximately normal. It requires both the number of successes  $np$  and failures  $nq$  in the sample to be at least 10.

**Common Question Types**

- Constructing Confidence Intervals: Calculate the confidence interval for a given sample proportion, confidence level, and sample size.
- Interpreting Confidence Intervals: Explain the meaning of a confidence interval in context.
- Determining Sample Size: Calculate the necessary sample size to achieve a desired margin of error and confidence level.

**Example**

A recent survey of 500 randomly selected students found that 320 of them use social media daily. Construct a 95% confidence interval for the proportion of all students who use social media daily.

**Solution**

- Calculate the sample proportion  $p = \frac{320}{500} = 0.64$ .
- Check the SuccessFailure Condition:  $np = 500 \cdot 0.64 = 320 \geq 10$  and  $nq = 500 \cdot 0.36 = 180 \geq 10$ .
- Find the critical value: For a 95% confidence level, the z-score is 1.96.
- Calculate the margin of error:  $E = z \cdot \sqrt{\frac{p(1-p)}{n}} = 1.96 \cdot \sqrt{\frac{0.64 \cdot 0.36}{500}} = 0.04$ .
- Construct the confidence interval:  $0.64 \pm 0.04$ , or  $0.60$  to  $0.68$ .

**Interpretation**

We are 95% confident that the true proportion of all students who use social media daily lies between 60% and 68%.

**Section 2 Hypothesis Tests for Proportions**

**Key Concepts**

- Null Hypothesis ( $H_0$ ): A statement about the population proportion that we are trying to disprove.
- Alternative Hypothesis ( $H_a$ ): A statement about the population proportion that we are trying to support.
- PValue: The probability of obtaining a sample proportion as extreme as the observed one, assuming the null hypothesis is true.
- Significance Level: The threshold for rejecting the null hypothesis. If the p-value is less than the significance level, we reject  $H_0$ .

**Common Question Types**

- Setting up Hypotheses: Formulate appropriate null and alternative hypotheses for a given scenario.
- Calculating the Test Statistic: Calculate the z-statistic to measure how far the sample proportion deviates from the hypothesized population proportion.
- Finding the PValue: Determine the p-value associated with the calculated test statistic.
- Making a Conclusion: Decide whether to reject or fail to reject the null hypothesis based on the p-value and significance level.

**Example**

A company claims that 70% of its customers are

satisfied with their service. A random sample of 100 customers reveals that only 62 of them are satisfied. Conduct a hypothesis test to determine if there is sufficient evidence to reject the company's claim at a 5% significance level.

**Solution 1** Hypotheses:  $H_0: p \geq 0.70$  vs  $H_a: p < 0.70$

2. Calculate the test statistic:  $z = \frac{p - p_0}{\sqrt{p_0(1-p_0)/n}} = \frac{0.62 - 0.70}{\sqrt{0.70(1-0.70)/100}} = -1.91$

3. Find the p-value: The p-value for a left-tailed test with  $z = -1.91$  is approximately 0.028.

4. Conclusion: Since the p-value (0.028) is less than the significance level (0.05), we reject the null hypothesis. There is sufficient evidence to suggest that the proportion of satisfied customers is less than 70%.

**Section 3** OneSample and TwoSample ZTests for Proportions Key Concepts

**OneSample ZTest** Used to compare a sample proportion to a hypothesized population proportion.

**TwoSample ZTest** Used to compare two sample proportions to determine if there is a significant difference between the corresponding population proportions.

**Pooled Proportion** An estimate of the common population proportion used in the two-sample z-test when the null hypothesis assumes equal proportions.

**Example** Two different marketing campaigns are being tested to see if they affect customer satisfaction. A random sample of 200 customers exposed to Campaign A shows 140 satisfied customers, while a random sample of 150 customers exposed to Campaign B shows 110 satisfied customers. Perform a two-sample z-test to determine if there is a significant difference in customer satisfaction between the two campaigns.

**Solution 1** Hypotheses:  $H_0: p_A = p_B$  vs  $H_a: p_A \neq p_B$

2. Calculate the pooled proportion:  $p = \frac{140 + 110}{200 + 150} = 0.68$

3. Calculate the test statistic:  $z = \frac{p_A - p_B}{\sqrt{p(1-p)/n_A + p(1-p)/n_B}} = \frac{140/200 - 110/150}{\sqrt{0.68(1-0.68)/200 + 0.68(1-0.68)/150}} = -1.96$

4. Find the p-value: The p-value for a two-tailed test with  $z = -1.96$  is approximately 0.05.

5. Conclusion: Since the p-value is approximately equal to the significance level (0.05), we fail to reject the null hypothesis. There is insufficient evidence to conclude that there is a significant difference in customer satisfaction between the two campaigns.

**Mastering inference for proportions** is a crucial step in developing a strong understanding of statistical reasoning. This blog post has provided a comprehensive overview of the key concepts, common question types, and practical examples to guide you through Chapter 6 of the AP Statistics curriculum. By utilizing these tools and applying them to real-world scenarios, you can confidently tackle the AP Statistics Quiz B and gain valuable insights into the power of statistical inference. Remember to always prioritize ethical considerations and ensure the responsible use of statistical methods to arrive at meaningful and trustworthy conclusions.

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