

94 calculating standard deviation answer key

9.4 Calculating Standard Deviation: Answer Key

Structure:

This document provides a comprehensive answer key for the exercises related to calculating standard deviation, specifically covering section 9.4 of an assumed textbook or course material. The structure follows a logical progression, mirroring the likely order of difficulty and concepts presented in the original exercises. Each problem is presented with its corresponding solution clearly delineated. The solutions include detailed explanations of the steps involved, highlighting the key formulas and concepts used. Where appropriate, alternative methods of solving the problems are also presented and compared. The answer key concludes with a brief summary of the key takeaways regarding standard deviation calculations.

Description:

This answer key serves as a valuable resource for students seeking to check their understanding and mastery of calculating standard deviation. It provides detailed solutions to a range of problems, progressing from simple calculations to more complex scenarios involving grouped data or different sample sizes. Each solution includes step-by-step explanations, making it easy for students to identify where they may have gone wrong in their own calculations. The clarity and comprehensiveness of the solutions are intended to enhance student learning and improve their problem-solving skills related to statistical analysis. The key is designed to be self-contained, requiring only a basic understanding of statistical terminology and arithmetic operations.

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Keywords: Standard Deviation, Statistics, Descriptive Statistics, Data Analysis, Sample Standard Deviation, Population Standard Deviation, Variance, Formula, Calculation, Answer Key, Exercise Solutions, Grouped Data, Ungrouped Data, Step-by-Step Solutions.

Summary:

This 1000-word document provides a complete answer key for problems related to calculating standard deviation, a crucial concept in descriptive statistics. It comprehensively addresses various types of problems, including those involving both sample and population data, ungrouped and grouped data. Each solution is meticulously explained, clarifying the application of

formulas and providing insights into the underlying statistical principles. The answer key aims to help students solidify their understanding of standard deviation calculations and develop their problem-solving skills. It's a valuable tool for self-assessment and learning reinforcement.

Publisher: Open Educational Resources (OER) Initiative, University of Example

Editor: Professor Michael Jones, PhD (Mathematics & Statistics)

(The following section would comprise the bulk of the document, approximately 800-900 words, detailing the solutions to the problems. Due to the open-ended nature of the problems, I will provide example solutions to illustrate the structure and level of detail. You would replace these examples with the actual problems and their solutions.)

Example Problem Solutions from Section 9.4:

Problem 1 (Ungrouped Data - Small Sample):

Problem: Calculate the sample standard deviation for the following data set: {2, 4, 6, 8, 10}.

Solution:

1. Calculate the mean ($\bar{x}$): $(2 + 4 + 6 + 8 + 10) / 5 = 6$

1. Calculate the deviations from the mean: $(2-6) = -4$, $(4-6) = -2$, $(6-6) = 0$, $(8-6) = 2$, $(10-6) = 4$

1. Square the deviations: $(-4)^2 = 16$, $(-2)^2 = 4$, $0^2 = 0$, $2^2 = 4$, $4^2 = 16$

1. Sum of squared deviations: $16 + 4 + 0 + 4 + 16 = 40$

1. Calculate the sample variance (s^2): $40 / (5-1) = 10$ (Note: We divide by

n-1 for sample variance)

1. Calculate the sample standard deviation (s): $\sqrt{10} \approx 3.16$

Problem 2 (Grouped Data):

Problem: Calculate the population standard deviation for the following grouped data:

Class Interval	Frequency (f)	Midpoint (x)
10-19	5	14.5
20-29	8	24.5
30-39	12	34.5

Solution: (This solution would involve calculating the weighted mean of the midpoints, then calculating the weighted sum of squared deviations from the mean, and finally, determining the population standard deviation using the appropriate formula and dividing by 'n' instead of 'n-1'.) Detailed steps for each calculation would be included.

Problem 3 (Large Sample with Outliers):

Problem: Analyze the impact of outliers on the standard deviation calculation. (This problem would present a data set with one or more outliers and ask students to calculate the standard deviation with and without the outliers, comparing the results and discussing the effect of outliers on the measure of spread.)

Solution: This solution would involve two separate standard deviation calculations: one including the outlier(s) and one excluding them. The results would then be compared, highlighting how the presence of outliers significantly increases the standard deviation, indicating greater variability in the data.

(The remaining problems and their solutions would follow a similar format, covering different aspects of standard deviation calculations, such as using technology for calculations, interpreting the results in context, and potentially comparing different measures of spread.)

Conclusion: This answer key provides a comprehensive guide to calculating standard deviation. Understanding standard deviation is crucial for interpreting data and making informed decisions based on statistical

analysis. Mastering the concepts and techniques presented here will equip students with valuable skills for further statistical studies.

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