

Statistics — Assignment 2

Class 11 Maths · Higher-difficulty challenge set + integrated problems · Answer key included · Narayan Gurukul Academy

Instructions: (1) Attempt all questions; start with the topic-wise challenge set, then attempt the integrated (multi-topic) problems.
 (2) Give all answers with correct SI units. $g = 10 \text{ m/s}^2$ unless stated.
 (3) A final answer key is provided at the end — try the full set before checking it.

Part A — Topic-wise challenge questions

Range and Measures of Dispersion

1. Find the range of the data 12, 6, 15, 9, 20, 4.
2. Why are measures of dispersion needed along with averages?
3. Find the range and coefficient of range of the data 25, 30, 18, 42, 35.

Mean Deviation for Ungrouped Data

1. Find the mean deviation about the mean of 6, 8, 10, 12.
2. Find the mean deviation about the median of 3, 5, 7, 9.
3. Find the mean deviation about the mean of 15, 18, 20, 22, 25.

Mean Deviation for Grouped Data

1. For the classes 0–10, 10–20, 20–30 with frequencies 2, 3, 5, write the midpoints.
2. Find the mean of the grouped data with midpoints 5, 15, 25 and frequencies 2, 3, 5.
3. Find the mean deviation about the mean for the data with classes 0–10, 10–20, 20–30 and frequencies 2, 3, 5.

Variance and Standard Deviation

1. Find the standard deviation of 4, 6, 8, 10.
2. Find the variance of 5, 10, 15.
3. Find the variance and standard deviation of 6, 8, 10, 12, 14.

Short-Cut and Step-Deviation Method

1. Using an assumed mean of 10, write the deviations of 6, 8, 12, 14.
2. For classes of width 10 and assumed mean A, write d_i for a midpoint 35.
3. Using the short-cut method with assumed mean 10, find the variance of 6, 8, 10, 12, 14.

Combined Mean, Variance and Coefficient of Variation

1. Find the combined mean of two groups with $n_1 = 10$, $\bar{x}_1 = 20$ and $n_2 = 15$, $\bar{x}_2 = 30$.
2. Find the coefficient of variation given mean 50 and standard deviation 5.
3. Two groups have means 40 and 60 with sizes 20 and 30. Find the combined mean.

Comparing Two Distributions

1. Distribution A: mean 60, SD 6. Find its coefficient of variation.
2. Two distributions have CVs 10% and 15%. Which is more consistent?
3. Compare two distributions: A has mean 50, SD 5; B has mean 40, SD 8. Which is more consistent?

Part B — Integrated problems (multi-topic)

1. Find the range of the data 12, 6, 15, 9, 20, 4.
2. Find the mean deviation about the mean of 6, 8, 10, 12.
3. Find the variance and standard deviation of 6, 8, 10, 12, 14.
4. Find the coefficient of variation given mean 50 and standard deviation 5.
5. Two distributions have CVs 10% and 15%. Which is more consistent?

Answer Key

Range and Measures of Dispersion

Range = $20 - 4 = 16$. Dispersion is needed because averages alone do not show spread. Range $18-42 = 24$, coefficient of range = $(42 - 18)/(42 + 18) = 0.4$.

Mean Deviation for Ungrouped Data

Mean = 9, MD = 2. Median = 6, MD = 2. Mean = 20, MD = 3.2.

Mean Deviation for Grouped Data

Midpoints 5, 15, 25. Mean = $(2 \times 5 + 3 \times 15 + 5 \times 25)/10 = 18$. MD about mean = 6.8.

Variance and Standard Deviation

Mean = 8, SD = $\sqrt{5}$. Mean = 10, variance = $50/3$. Mean = 10, variance = 8, SD ≈ 2.83 .

Short-Cut and Step-Deviation Method

Deviations -4, -2, 2, 4. Given $h = 10$, A and midpoint 35: $d = (35 - A)/10$. Short-cut variance of 6, 8, 10, 12, 14 = 8.

Combined Mean, Variance and Coefficient of Variation

Combined mean = $(10 \times 20 + 15 \times 30)/25 = 26$. CV = $(5/50) \times 100 = 10\%$. Combined mean of 40 and 60 with sizes 20, 30 = $(20 \times 40 + 30 \times 60)/50 = 52$.

Comparing Two Distributions

CV = 10%. The one with 10% is more consistent. A: CV = 10%, B: CV = 20% → A is more consistent.

Integrated problems

1: 16. 2: 2. 3: variance 8, SD ≈ 2.83 . 4: 10%. 5: The one with CV 10%.