

SSC GD Constable Exam: Averages Syllabus Summary

Overview:

The Averages topic is an important part of the Mathematics section in the SSC GD Constable Exam, contributing approximately 2–4 questions (4–8 marks out of 160 total marks) in the Computer-Based Examination (CBE). The syllabus focuses on calculating the arithmetic mean (average) of a set of numbers and applying it to real-world problems, such as finding average scores, speeds, weights, or costs. Questions test computational accuracy, understanding of average concepts, and problem-solving skills at a 10th-grade level. The exam includes 80 questions (2 marks each, 0.50 negative marking per wrong answer) to be completed in 60 minutes.

Key Topics in Averages:

1. Arithmetic Mean: Calculating the average of a set of numbers.
2. Weighted Average: Calculating averages when quantities have different weights.
3. Applications: Solving word problems involving averages (e.g., marks, ages, speeds, prices).
4. Effect of Changes: Impact of adding, removing, or replacing numbers on the average.
5. Combined Averages: Finding the average of multiple groups.
6. Average in Sequences: Averages in arithmetic sequences.
7. Word Problems: Real-world scenarios like average income, distance, or consumption.
8. Simplification: Using averages to simplify calculations in problems.

Important Formula and Techniques:

1. Arithmetic Mean (Average):
 - Formula: $\text{Average} = (\text{Sum of all observations}) / (\text{Number of observations})$.
 - Example: Average of 10, 20, 30 = $(10 + 20 + 30) / 3 = 60 / 3 = 20$.
2. Weighted Average:

- Formula: Weighted Average = (Sum of (Value \times Weight)) / (Sum of Weights).

- Example: Marks 80 (weight 2) and 90 (weight 3), Weighted Average = $(80 \times 2 + 90 \times 3) / (2 + 3) = (160 + 270) / 5 = 430 / 5 = 86$.

3. Sum of Observations:

- Sum = Average \times Number of observations.

- Example: If average of 5 numbers is 20, Sum = $20 \times 5 = 100$.

4. Effect of Adding/Removing an Observation:

- New Average = Old Average + (New Observation – Old Average) / New Number of Observations.

- Example: Average of 5 numbers is 20. Add 30, New Average = $20 + (30 - 20) / 6 = 20 + 10/6 = 20 + 1.67 = 21.67$.

- If an observation is removed: New Average = Old Average – (Removed Observation – Old Average) / New Number of Observations.

5. Combined Average of Two Groups:

- Combined Average = $(n_1A_1 + n_2A_2) / (n_1 + n_2)$, where n_1, n_2 are number of items, A_1, A_2 are averages of groups.

- Example: Group 1: 5 students, average 60; Group 2: 3 students, average 70. Combined Average = $(5 \times 60 + 3 \times 70) / (5 + 3) = (300 + 210) / 8 = 510 / 8 = 63.75$.

6. Average in Arithmetic Sequence:

- Average = (First term + Last term) / 2.

- Example: Average of numbers 1, 3, 5, 7, 9 = $(1 + 9) / 2 = 5$.

7. Effect of Uniform Increase/Decrease:

- If each number in a set increases/decreases by a constant k , the average increases/decreases by k .

- Example: Average of 10, 20, 30 is 20. Increase each by 5, new average = $20 + 5 = 25$.

8. Word Problem Applications:

- Example (Speed): A car travels 60 km at 30 km/h and 60 km at 40 km/h.
Average speed = Total distance / Total time = $120 / [(60/30) + (60/40)] = 120 / (2 + 1.5) = 120 / 3.5 = 34.29$ km/h.

- Example (Ages): Average age of 4 people is 25. A new person joins, and average becomes 26. New person's age = $26 \times 5 - 25 \times 4 = 130 - 100 = 30$ years.

Key Points for SSC GD Preparation:

- Focus Areas: Calculating arithmetic and weighted averages, solving word problems (e.g., marks, ages, speeds), and understanding the effect of changes on averages are frequently tested.
- Question Types: Direct average calculations (e.g., average of 5 numbers), weighted averages, combined averages, and word problems (e.g., average speed or cost).
- Difficulty Level: 10th-grade level, requiring quick and accurate calculations with averages.
- Practice Tips: Master average and weighted average formulas, practice word problems involving real-world scenarios, and solve past SSC GD papers to improve speed and accuracy.

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