

CLASS 9 · HOTS · OLYMPIAD PREPARATION · SHORT NOTES

Chapter 10: HOTS: Understanding Data, Weighted Mean (Class 9)

Topic-wise short notes with solved examples

Higher order thinking questions on the weighted mean for Class 9: weighted scores, mixtures, combining groups of different sizes, the score needed for a target average and reading shares from a stacked bar chart, each with a full solution.

1 Solved HOTS questions

- The **weighted mean** of values $x_1, x_2, \dots$ with weights $w_1, w_2, \dots$ is $\frac{w_1x_1 + w_2x_2 + \dots}{w_1 + w_2 + \dots}$. When groups are of different sizes, the size is the weight. The weighted mean always lies between the smallest and the largest value.

Example 1.1 A student's marks are 80 in a subject of weight 2, 70 in a subject of weight 3, and 90 in a subject of weight 5. Find the weighted mean.

SOLUTION

$$\frac{2 \times 80 + 3 \times 70 + 5 \times 90}{2 + 3 + 5} = \frac{160 + 210 + 450}{10}$$

82

Example 1.2 20 kg of rice costing Rs 40 per kg is mixed with 30 kg of rice costing Rs 50 per kg. Find the cost per kg of the mixture.

SOLUTION

$$\text{Total cost} = 20 \times 40 + 30 \times 50 = 800 + 1500 = 2300.$$

$$\text{Total quantity} = 50 \text{ kg.}$$

Rs 46 per kg

Example 1.3 In one class of 25 students the average mark is 72 and in another class of 15 students the average mark is 56. Find the average of all 40 students.

SOLUTION

$$\text{Total marks} = 25 \times 72 + 15 \times 56 = 1800 + 840 = 2640.$$

$$\text{Average} = \frac{2640}{40}.$$

66

Example 1.4 A student's average in 3 tests is 70. What must the mark be in the fourth test so that the average of the four tests is 75?

SOLUTION

The four tests must total $4 \times 75 = 300$. The first three total $3 \times 70 = 210$.

The fourth mark is $300 - 210$.

90

Example 1.5 In a stacked bar chart of 200 students, the bar for boys has height 120 and the bar for girls has height 80. What percentage of the students are girls?

SOLUTION

Girls are $\frac{80}{200} \times 100$.

40%