

CLASS 8 · HOTS · OLYMPIAD PREPARATION · SHORT NOTES

Chapter 14: HOTS: Tales by Dots and Lines (Class 8)

Topic-wise short notes with solved examples

Higher order thinking questions on data for Class 8: the mean and the median, changes in the mean when data change, data given with frequencies and reading line graphs, each with a full solution.

1 Solved HOTS questions

- The **mean** is $\frac{\text{sum of values}}{\text{number of values}}$. The **median** is the middle value of the ordered data (the mean of the two middle values when the count is even). With frequencies, the mean is $\frac{\sum(\text{value} \times \text{frequency})}{\sum \text{frequency}}$. When a value is added, removed or changed, work with the **sum**.

Example 1.1 Find the mean of 4, 8, 12, 16 and 20.

SOLUTION

The sum is 60 and there are 5 values.

12

Example 1.2 The mean of 5 numbers is 20. One number, 30, is removed. Find the mean of the remaining numbers.

SOLUTION

Old sum = 100. New sum = $100 - 30 = 70$ for 4 numbers.

New mean = $\frac{70}{4}$.

17.5

Example 1.3 Find the median of 7, 3, 9, 5, 11 and 4.

SOLUTION

Arranged in order: 3, 4, 5, 7, 9, 11.

There are 6 values, so the median is the mean of the 3rd and 4th: $\frac{5 + 7}{2}$.

6

Example 1.4 The values 1, 2 and 3 occur 2, 3 and 5 times respectively. Find the mean.

SOLUTION

$$\frac{1 \times 2 + 2 \times 3 + 3 \times 5}{2 + 3 + 5} = \frac{2 + 6 + 15}{10}.$$

2.3

Example 1.5 A line graph shows the temperature as 20 degrees at 6 am, 24 degrees at 9 am, 29 degrees at 12 noon and 27 degrees at 3 pm. By how much did the temperature rise from 6 am to noon, and when did it start to fall?

SOLUTION

Rise = $29 - 20 = 9$ degrees.

The line goes down after noon, because 27 is less than 29.

A rise of 9 degrees; it started to fall after 12 noon