

Connecting the Dots Class 7 Notes Maths Part 2 Chapter 5

The term statistics refers to the study of collecting, organizing, analysing, interpreting and presenting data. We can answer a statistical question by collecting data. For example, 'What is the cost of your notebook?' needs data. But 'Do you have a pencil?' is not a statistical question because it is just asking yes or no. We can make it statistical by asking, 'How many students have a pencil?' because that question needs data to answer.

Example: Which of the following are statistical questions: (a) What was the rainfall pattern in Delhi last month? (b) What is the price of a cricket ball in India? (c) Do you like playing cricket? (d) How tall are grade 5 boys in your school? (e) Are potatoes costlier in Jaipur or Delhi? Solution: a, b, d, and e are statistical questions.

Representative Values

The average is said to be the representative value of a data. It is also known as the arithmetic mean.

Arithmetic Mean = $\frac{\text{Sum of all the values in the data}}{\text{Number of values in the data}}$

Or

$$AM = \frac{x_1 + x_2 + x_3 + \dots + x_n}{n}$$

where $x_1, x_2, x_3, \dots, x_n$ are the values n = total number of values

For example: Find the arithmetic mean of the numbers 10, 10, 15, 20, 25, and 34. Step 1: Add all the numbers: $10 + 10 + 15 + 20 + 25 + 34 = 114$. Step 2: Count the numbers. There are 6 numbers. Now apply the formula. $AM = \frac{\text{Sum of values}}{\text{No. of values}} = \frac{114}{6} = 19$

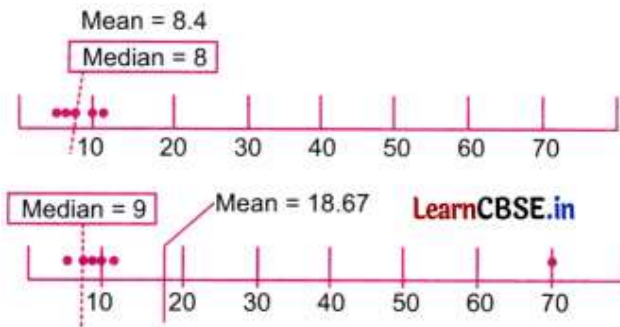
The arithmetic mean is 19.

We can represent the given data in a dot plot to visualise its variability and patterns.



A dot plot is a simple graph that shows each data point along a number line. The arithmetic mean is used in real life to find the average of numbers for decision-making comparisons, or analysis, like average grades, expenses, or temperature. The median value of a set of numbers is the value of the middle number when they have been placed in ascending or descending order of size.

Let's look at the example. Five cousins are spending their vacation at their grandma's house. Their ages are 5, 8, 12, 7, and 10. Find the median age of the cousin. Step 1: Arrange the ages in ascending or descending order: 5, 7, 8, 10, 12. Step 2: Find the median. There are 5 ages (odd), so the middle value is the 3rd one: Median age = 8 years. If their grandma's age is 70. Now find the median age of the group. Step 1: Arrange all ages in ascending order: 5, 7, 8, 10, 12, 70 Step 2: Find the Median. There are 6 ages (even), so the median is the average of the two middle numbers (8 and 10). Median age = $\frac{8+10}{2} = 9$



The graph shows a representation of their ages on the dot plot.

Here, the grandma's age is shown as an outlier that affects the mean but not the median.

(Outlier: Values in a data set that are much higher or lower than most other values.)

The above explanation can be summarized as follows:

When the number of observations is odd

Median = Value of $(\frac{n+1}{2})$ th term

(n = number of observations)

When the number of observations is even

Median = Average of $\frac{n}{2}$ and $(\frac{n}{2} + 1)$ th term (n = number of observations)

Mean and median are called measures of central tendency; i.e., the tendency of the values to pile up around a particular value.

Visualising Data

Data are understood more if they are presented as a picture. This is called data visualization. Two-

column graphs can also be combined into a single graph. This is called a clustered column graph.

These graphs can be used to compare and visualise values across categories and across time.

Data Detective

When we organize and present data clearly and concisely, it can reveal fascinating insights, uncover hidden patterns, and even help us solve problems. Just like a detective uses clues to crack a case, we can use data to uncover the story behind the numbers.

Dot plots help us get a quick glimpse of the variability of the data— minimum, maximum, range, and how the data is clustered or spread out. The Arithmetic Mean =

$\frac{\text{Sum of all the values in the data}}{\text{Number of values in the data}}$. The Median is the number in the middle of any sorted data. If there are an even number of values, then the median is the average of the two middle numbers. We can describe and compare data in several ways, including by referring to the minimum, maximum, total, range, arithmetic mean, and median. We learnt how to read and make clustered bar graphs. These graphs can be used to compare and visualise values across categories and across time. Examining data can lead to new questions and directions to probe further.