

Diagrammatic Representation of Data

Suppose you are interested to compare the marks of your mates in a test. How can you make the [comparison](#) interesting? It can be done by the diagrammatic representations of data. You can use a bar diagram, histograms, pie-charts etc for this. You will be able to answer questions like –

How will you find out the number of students in the various categories of marks in a certain test? What can you say about the marks obtained by the maximum students? Also, how can you compare the marks of your classmates in five other tests? Is it possible for you to remember the marks of each and every student in all subjects? No! Also, you don't have the time to compare the marks of every student. Merely noting down the marks and doing comparisons is not interesting at all. Let us study them in detail.

Suggested Videos



Tally Marks Method H



Frequency Distribution



Histogram for Continuous Grouped
Frequency Distribution

Bar Diagram

This is one of the simplest techniques to do the comparison for a given set of data. A bar graph is a graphical representation of the data in the form of rectangular bars or columns of equal width. It is the simplest one and easily understandable among the graphs by a group of people.

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- [Introduction to Statistics](#)
- [Textual and Tabular Representation of Data](#)
- [Frequency Distribution](#)
- [Histogram](#)
- [Frequency Polygon](#)
- [Cumulative Frequency Graph or Ogive](#)

Construction of a Bar Diagram

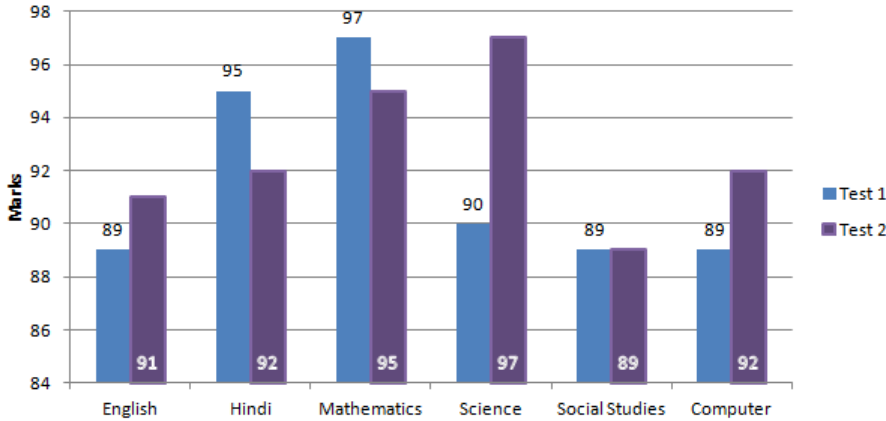
1. Draw two perpendicular lines intersecting each other at a point O. The vertical line is the y-axis and the horizontal is the x-axis.
2. Choose a suitable scale to determine the height of each bar.
3. On the horizontal line, draw the bars at equal distance with corresponding heights.
4. The space between the bars should be equal.

Properties of a Bar Diagram

- Each bar or column in a bar graph is of equal width.
- All bars have a common base.
- The height of the bar corresponds to the value of the data.
- The distance between each bar is the same.

Types of Bar Diagram

A bar graph can be either vertical or horizontal depending upon the choice of the axis as the base. The horizontal bar diagram is used for qualitative data. The vertical bar diagram is used for the quantitative data or time series data. Let us take an example of a bar graph showing the comparison of marks of a student in all subjects out of 100 marks for two tests.



With the bar graph, we can also compare the marks of students in each subject other than the marks of one student in every subject. Also, we can draw the bar graph for every student in all subjects.

Histogram

We can use another way of diagrammatical representation of data. If we are working with a continuous data set or grouped dataset, we can use a histogram for the representation of data.

- A histogram is similar to a bar graph except for the fact that there is no gap between the rectangular bars. The rectangular bars show the area proportional to the **frequency** of a **variable** and the width of the bars represents the class width or class interval.
- Frequency means the number of times a variable is occurring or is present. It is

an area graph. The heights of the **rectangles** are proportional to the corresponding frequencies of similar classes.

Construction of Histogram

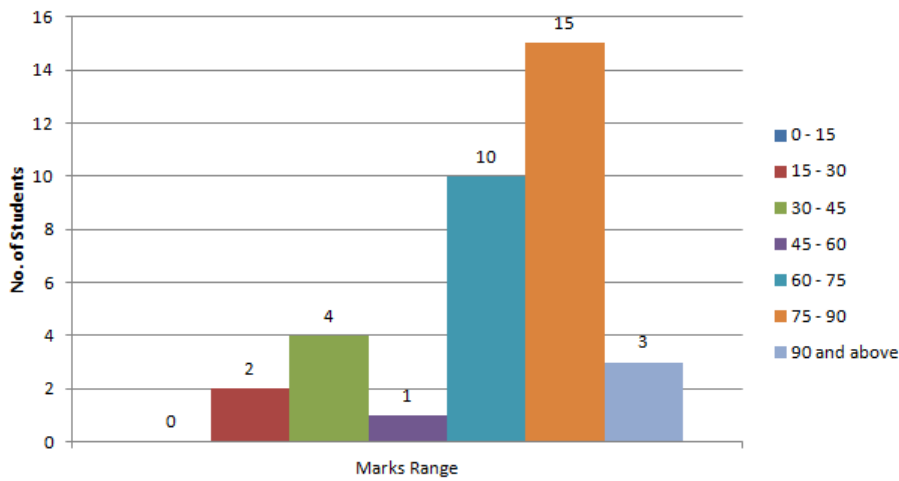
1. Draw two perpendicular lines intersecting each other at a point O. The vertical line is the y-axis and the horizontal is the x-axis.
2. Choose a suitable scale for both the axes to determine the height and width of each bar
3. On the horizontal line, draw the bars with corresponding heights
4. There should be no gap between two consecutive bars showing the continuity of the data
5. If the grouped frequencies are not continuous, the first thing to do is to make them continuous

It is done by adding the **average** of the difference between the lower limit of the class interval and the upper limit of the preceding class width to the upper **limits** of all the classes. The same quantity is subtracted from the lower limits of the classes.

Properties of Histogram

- Each bar or column in a bar graph is of equal width and corresponds to the equal class interval
- If the classes are of unequal width then the height of the bars will be proportional to the ration of the frequencies to the width of the classes
- All bars have a common base
- The height of the bar corresponds to the frequency of the data

Suppose we have a data set showing the marks obtained out of 100 by a group of 35 students in statistics. We can find the number of students in the various marks category with the help of the histogram.



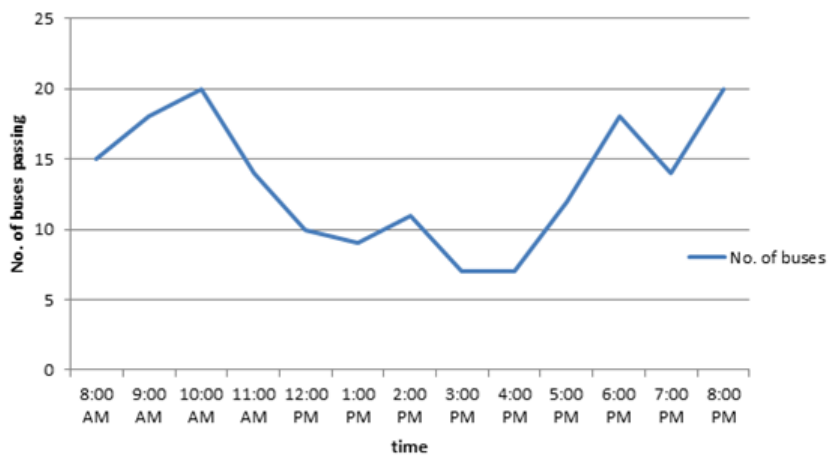
Line Graph

A line graph is a type of chart or graph which shows information when a series of data is joined by a line. It shows the changes in the data over a period of time. In a simple line graph, we plot each pair of values of (x, y) . Here, the x-axis denotes the various time point (t) , and the y-axis denotes the observation based on the time.

Properties of a Line Graph

- It consists of Vertical and Horizontal scales. These scales may or may not be uniform.
- Data point corresponds to the change over a period of time.
- The line joining these data points shows the trend of change.

Below is the line graph showing the number of buses passing through a particular street over a period of time:



Solved Examples for diagrammatic Representation of Data

Problem 1: Draw the histogram for the given data.

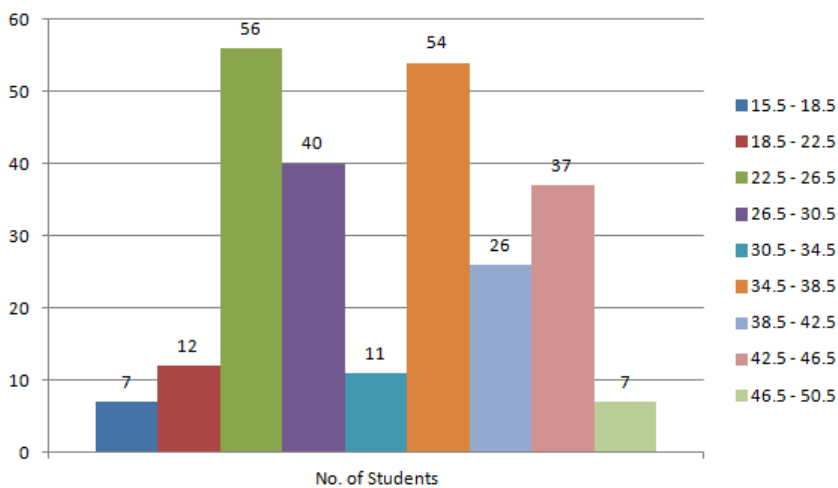
Marks	No. of Students
15 – 18	7
19 – 22	12
23 – 26	56
27 – 30	40
31 – 34	11
35 – 38	54
39 – 42	26
43 – 46	37
47 – 50	7
Total	250

Solution: This grouped frequency distribution is not continuous. We need to convert it into a continuous distribution with exclusive type classes. This is done by averaging

the difference of the lower limit of one class and the upper limit of the preceding class. Here, $d = \frac{1}{2} (19 - 18) = \frac{1}{2} = 0.5$. We add 0.5 to all the upper limits and we subtract 0.5 from all the lower limits.

Marks	No. of Students
14.5 – 18.5	7
18.5 – 22.5	12
22.5 – 26.5	56
26.5 – 30.5	40
30.5 – 34.5	11
34.5 – 38.5	54
38.5 – 42.5	26
42.5 – 46.5	37
46.5 – 50.6	7
Total	250

The corresponding histogram is



Problem 2:

Draw a line graph for the production of two types of crops for the given years.

Year	Crop I	Crop II
1968	10	12
1978	12	10
1988	15	21
1998	30	20
2008	18	17
2018	25	25

Solution: The required graph is

