# GRAPHS AND DIAGRAMS
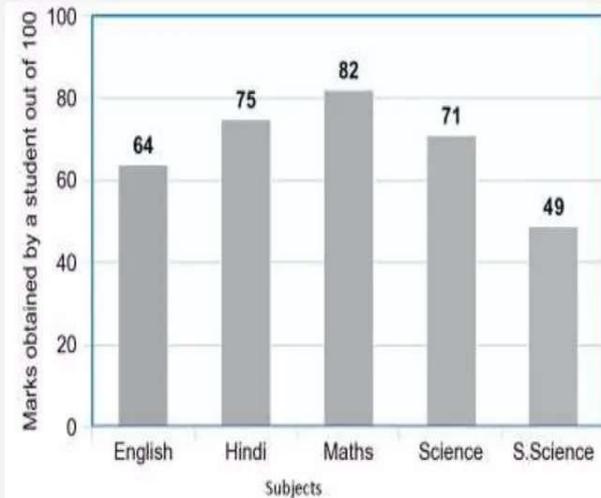
# GRAPHS

- Graph can be defined as a pictorial representation or a diagram that represents data or values in an organized manner.

- The points on the graph often represent the relationship between two or more things.

- Important graphical representations used in statistics are
  - bar diagram
  - Histogram
  - frequency polygon
  - cumulative frequency curve

# USES OF GRAPHS

- easier, more convenient and quicker to draw inferences

- Comparison of data also becomes easier

- helps us to understand any data very easily

- explain statistical data

# BAR-DIAGRAM



- A bar diagram is a chart that uses bars to show comparisons between categories of data.

- The bars can be either horizontal or vertical.

- Bar graphs can be either horizontal or vertical.

- The height or length of each bar relates directly to its value.

- A bar diagram will have two axes.

**Uses of Bar Diagrams**

Compare the performance of students in different school subjects

Compare the different persons or groups on a single or many variables.

# PIE DIAGRAM

- resembles pie and with the help of a circle – called as circle graph or sector graph or angular graph.

- A circle may be sub-divided into sectors by subtending the angles at the centre of the circle.

- Each data is expressed in degrees.

**Construction of Pie-Diagram**

An angle of a circle is $360^0$. By using the following formula we can represent the given data in the Pie diagram.

Pie diagram = (f/N) × $360^0$
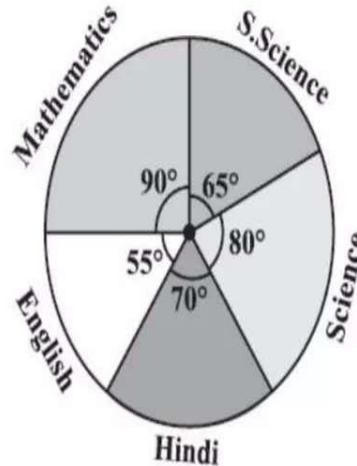
To find the fraction,

we divide angle by 360° because

360° is the central angle of circle.

| Subject | Angle | Fraction $= \left(\frac{Angle}{360°}\right)$ | Marks Obtained $= (\text{Fraction} \times 540)$ |
|---|---|---|---|
| Mathematics | 90° | $\frac{90}{360} = \frac{1}{4}$ | $\frac{1}{4} \times 540 = 135$ |
| English | 55° | $\frac{55}{360} = \frac{11}{72}$ | $\frac{11}{72} \times 540 = 82.5$ |
| Hindi | 70° | $\frac{70}{360} = \frac{7}{36}$ | $\frac{7}{36} \times 540 = 105$ |
| Science | 80° | $\frac{80}{360} = \frac{2}{9}$ | $\frac{2}{9} \times 540 = 120$ |
| S. Science | 65° | $\frac{65}{360} = \frac{13}{72}$ | $\frac{13}{72} \times 540 = 97.50$ |

# HISTOGRAM

- Looks very much like a bar chart.

- The frequencies within each interval of Histogram are presented by a rectangle,

- The base of which equals the length of the class interval and height of which equals the numbers of the scores within a given class interval.

- In Histogram the scores are assumed to be spread uniformly over the
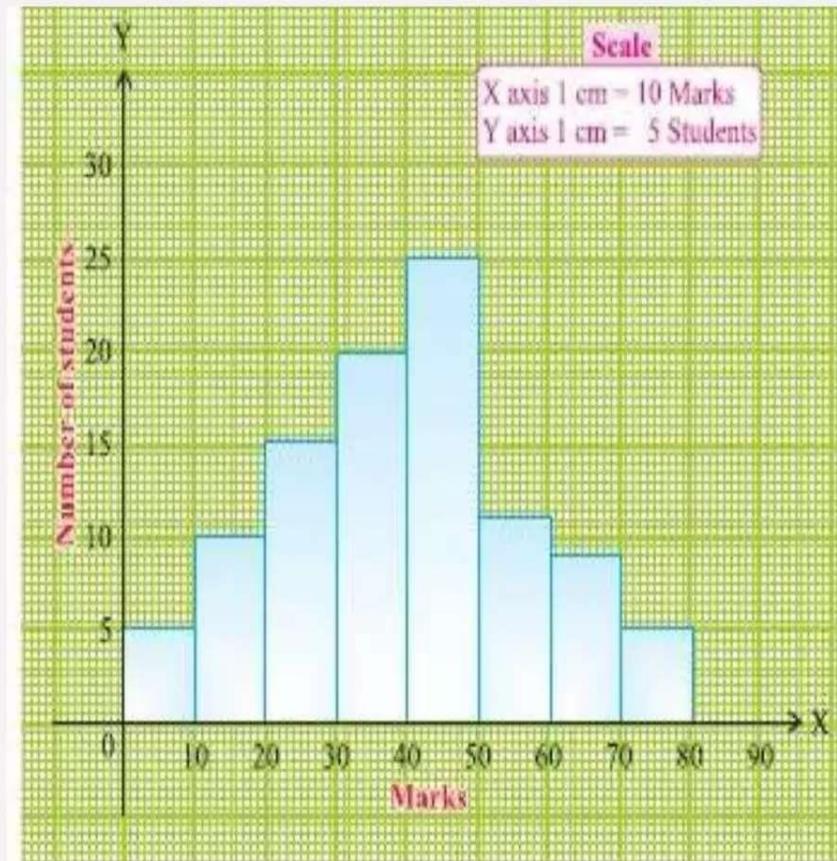
# FREQUENCY POLYGON

- A line graph of class frequency plotted against class midpoint.

- Obtained by joining the midpoints of the tops of the rectangles in the histogram.

- Since a polygon is a complete figure its ends should touch the baseline.

- The area under the frequency polygon represents the total frequency of the entire distribution.
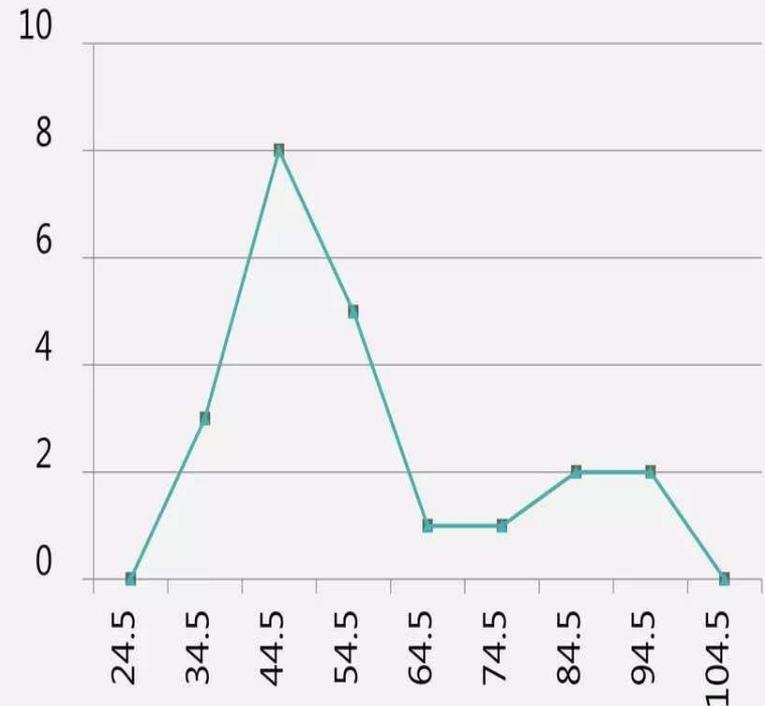
**Uses of Frequency Polygon**

- To compare two or more frequency distributions, frequency polygon is the best suited one.

# CUMULATIVE FREQUENCY PERCENTAGE CURVE – OGIVE CURVE

- Here the frequencies are expressed as cumulative percents of N(total number of cases).

- Size of the classes are plotted against the percentage of the cumulative frequency of the class.

- When plotted on normal graph paper, the cumulative frequency curve resembles an S-shape.

- Here cumulative percentage frequency is taken on the Y-axis when we take exact upper limit of class intervals in x-axis.

| Class interval | Exact Limit | | Frequency | Less than C.F | % of less than C.F | More than C.F | % of more than C.F |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | Lower limit | Upper limit | | | | | |
| 30-39 | 29.5 | 39.5 | 3 | 3 | 13.64 | 22 | 100 |
| 40-49 | 39.5 | 49.5 | 8 | 11 | 50 | 19 | 86.36 |
| 50-59 | 49.5 | 59.5 | 5 | 16 | 72.73 | 11 | 50 |
| 60-69 | 59.5 | 69.5 | 1 | 17 | 77.28 | 6 | 27.27 |
| 70.-79 | 69.5 | 79.5 | 1 | 18 | 81.82 | 5 | 22.73 |
| 80-89 | 89.5 | 99.5 | 2 | 20 | 90.91 | 4 | 18.18 |

# USES OF OGIVE

- To find percentiles, quartiles, Q.D. and median.

- To find the percentile rank of a given mark.

- Overall comparison of 2 or more groups on some variables.

- Intra-student comparisons on more than one subject.