the upper boundary of the concerned class. Again, some specific more-than type cumulative frequency represents the number of values above or equal to the lower boundary of the corresponding class. Thus, cumulative frequencies of less-than type correspond to upper boundaries and those of more-than type to lower boundaries.

Example 2.1 Suppose the following data relating to marks in a test on Mathematics of 50 students in a college were noted:

42	37	46	48	63	64	63	53	57	55
72	55	54	33	48	56	34	77	65	58
47	59	44	35	75	40	45	56	55	65
48	56	52	53	34	42	58	65	43	54
46	57	62	58	53	43	47	54	60	48

Arrange the data in the form of a frequency distribution table in 5 classes of equal length. Prepare the table for cumulative frequencies and relative frequencies.

Here the smallest value = 33 and the greatest value = 77. So, range = 77 − 33 = 44. We consider range as 50, slightly bigger than the range obtained from the data and hence form five classes each of length 10.

Table 2.6 TALLY MARKS FOR THE DATA ON MARKS

class limits	Tally marks
31-40	𝍸 I
41-50	𝍸 𝍸 IIII
51-60	𝍸 𝍸 𝍸 𝍸
61-70	𝍸 II
71-80	III

Table 2.7

FREQUENCY DISTRIBUTION OF MARKS OF 50 STUDENTS IN A COLLEGE

Class boundaries	Frequency
30.5 – 40.5	6
40.5 – 50.5	14
50.5 – 60.5	20
60.5 – 70.5	7
70.5 – 80.5	3
Total	50

Table 2.8

RELATIVE FREQUENCY AND CUMULATIVE FREQUENCY TABLE OF MARKS

Class boundaries	Relative frequency	Cumulative frequency	
		less-than type	More-than type
30.5 – 40.5	0.12	6	50
40.5 – 50.5	0.28	20	44
50.5 – 60.5	0.40	40	30
60.5 – 70.5	0.14	47	10
70.5 – 80.5	0.06	50	3
Total	1.00	—	—

2.3 Diagrammatic representation of frequency distribution

If a frequency distribution is exhibited in diagrams, then an overall idea regarding the distribution may be readily developed. There are several modes of such graphical representation but the choice of suitable figure depends on the

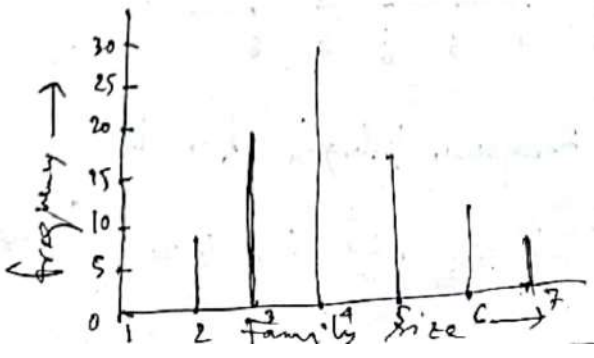
nature of the character concerned.

(a) Case of an attribute

The frequency distribution of an attribute when expressed in terms of absolute frequencies, may be diagrammatically represented by bar diagram with horizontal bars. However, divided bar diagram or pie diagram is appropriate for frequency distribution in terms of relative frequencies.

(b) Case of a discrete variable

(i) Column diagram: In representing the frequency distribution of a discrete variable graphically, at the outset, we may take two mutually perpendicular axes of co-ordinates, the horizontal and vertical axes respectively showing the variable values and the frequencies. Of course, scale for each of the axes has to be appropriately chosen. Next perpendiculars (or columns) having heights equal to the frequencies of the variable values are drawn at the corresponding points (indicating variable values) on the horizontal axis. The diagram so formed is called a column diagram or frequency bar diagram.



(Table 2.4)
Figure 2.1 Column diagram for the frequency distribution of family size

(ii) Frequency polygon : It is a suitable diagrammatic mode of exhibiting the frequency distribution of a discrete variable. Here, also, the variable values are located on the horizontal axis and the frequencies on the vertical axis, in a rectangular system of coordinates. The ~~paired~~ available data plotted as points on the plane where the abscissa and ordinate for a point respectively indicate the variable value and the corresponding frequency. To get a closed figure, the variable value just preceding the least and that following the highest (each with zero frequency) are included in the horizontal axis. Finally, the points are joined by line segments. The polygon drawn in this way is termed as a frequency polygon

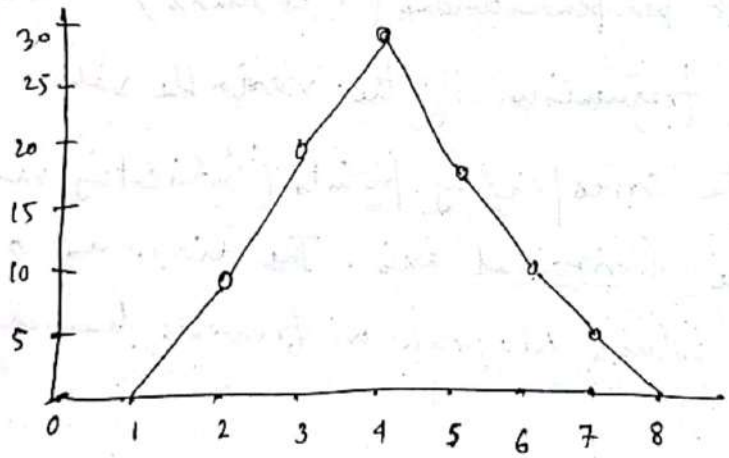


Figure 2.2 Frequency polygon for the frequency distribution of family size (Table 2.4)