

Frequency Distribution

A frequency distribution is a representation, either in a graphical or tabular format, that displays the number of observations within a given interval.

* The frequency of an observation tells ^{you} the number of times the observation occurs in the data. (for example

1, 2, 3, 4, 6, 9, 9, 8, 5, 1, 1, 9, 9, 0, 6, 9

→ frequency of the number 9 is 5.) (9 occurs 5 times)

Important Terms of Frequency Distribution

1. Variable:- Any characteristic which varies in is called a variable. The characteristic such as marks, sales, height, weight etc.

A variable may be of two types

→ Discrete

→ Continuous.

2. Discrete Variable:- Those variables which are exact or finite cannot be expressed in decimals.

3. Continuous Variable:- It is expressed in fraction or decimals.

4. Series:- It is systematic arrangement of terms into an order. It is of two types:-

(a) Discrete Series (b) Continuous Series.

Types of Frequency Distribution.

(a) Discrete Series

(b) Continuous Series.

① Discrete Series. In this form of distribution, the frequency refer to discrete value.

→ The Process of Preparing this type of distribution is very simple. We have to just to count the number of times a particular value is repeated, which is called frequency.

→ In order to facilitate counting Prepare a column for tally marks

→ In another column, place all values from the lowest-to the highest.

Example.

1	0	3	2	1	5	6	2
2	1	0	3	4	2	1	6
3	2	1	5	3	3	2	4

Sol:

Number	Tally marks	frequency
0	==	2
1	≠	5
2	≠	5
3	≡≡	4
4	==	2
5	==	2
6	==	2

② Continuous / Grouped Frequency Distribution.

A frequency series made for a continuous variable, in terms of class intervals is called continuous frequency distribution.

→ class intervals begin with the least value and go up to maximum with equal and unequal width of classes without break.

Example of Continuous Series:-

Marks (X)	No of Students (f)
0-10	8
10-20	5
20-30	10
30-40	2
40-50	15

Components of Continuous Frequency Distribution.

(i) Class Limits:- The class limits are the lowest and the highest values that can be included in the class.

for example 1. 10-20
 ↑ ↑
 lowest value highest value.

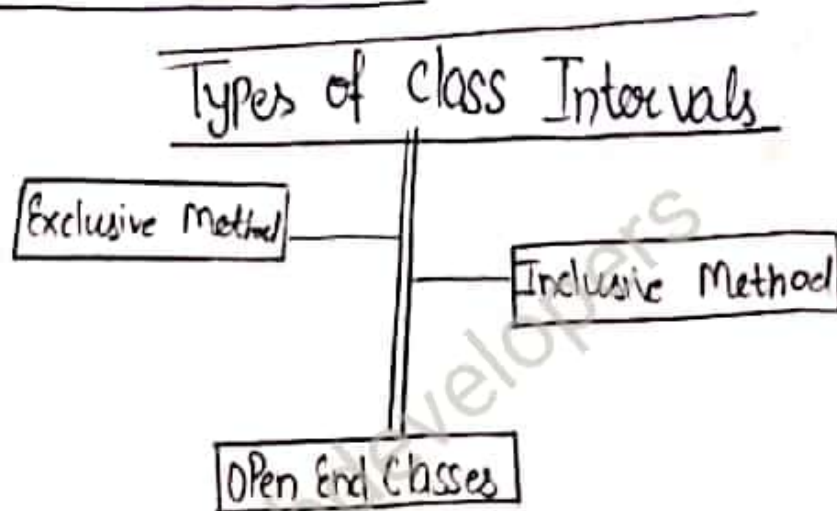
→ The two boundaries of class are known as the lower limit and upper limit.

→ lower class limit is denoted by $\rightarrow L$, upper class limit $\rightarrow U$

(10) Class-Intervals:- The difference between the lower limit and the upper limit of the class is known as the class-Interval.

Formula:- $i = \frac{L-S}{k}$

Types of Class Intervals:-



i) Exclusive Method:- In the exclusive series upper limit of the first class is equal to the lower limit of the second class.

→ There is always repetition of upper limit of a class as the lower limit of next class

Marks (x)	No. of Students (f)
0-10	2
10-20	5
20-30	8
30-40	10
40-50	18

- (2) Inclusive Method: In this, Both the lower and upper limits are included in the class Interval.
- The upper limit of the first class is less than the lower limit of second class
 - It includes all items upto upper limit
 - There is no repetition of upper limit of a class as a lower limit of the next class Interval.

Marks (x)	No. of students (f)
0-9	5
10-19	10
20-29	15
30-39	9
40-49	6

- 3) Open-end Classes: Open end series is that series in which the lower limit of the first class Interval and upper limit of the last class interval are missing.
- 'Below' or 'less than' is specified in place of lower limit in first class interval and 'above' or 'more than' is specified in place of upper limit in last in the last class Interval.
 - A Class limit is missing either at the lower end of the first class Interval or at the upper end of the last class Interval or both are not specified.

Example:

Salary Range.	No. of workers
Below - 2000	7
2000 - 4000	5
4000 - 6000	6
6000 - 8000	4
8000 and above	3

(ii) Less than type:

INCOME (₹) x	NO. OF PERSONS (C.F.)	INCOME (₹) X	NO. OF PERSONS (d)
Less than 100	5	50-100	5
150	11	100-150	11-5 = 12
200	39	150-200	39-11 = 28
250	71	200-250	71-39 = 32
300	86	250-300	86-71 = 15
350	98	300-350	98-86 = 12
400	109	350-400	109-98 = 11
			$\Sigma f = N = 109$

(iii) More than type:

INCOME (₹) x	NO. OF PERSONS (C.F.)	INCOME (₹) X	NO. OF PERSONS (d)
more than 50	109	50-100	109-97 = 5
100	97	100-150	97-85 = 12
150	85	150-200	85-63 = 22
200	63	200-250	63-31 = 32
250	31	250-300	31-16 = 15
300	16	300-350	16-4 = 12
350	4	350-400	4
			$\Sigma f = N = 109$

* Range: The difference between largest and smallest value of the observation is called Range.

→ It is denoted by R.

$$R = \text{Largest value (L)} - \text{Smallest value (S)}$$

* Mid value: The central point of a class interval is called the mid value.

$$\text{mid value} = \frac{L+U}{2}$$

L = Lower limit

U = Upper limit

* Class Interval: It is difference between the upper and lower limits of a class.

→ It is denoted by 'i'

$$\text{Class Interval} = U - L$$

for example: $\frac{(10-20)}{U-L} = 20-10 = 10$

* Class Limits: Each class has two limits.
(i) Upper limit (ii) Lower limit.

U → upper limit, L → lower limit

* Frequency: The Number of Observation falling within a Particular class interval is called frequency of that class.

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For Example:-

Weight	Number of students
20-30	25
30-40	53
40-50	77
50-60	95
60-70	80
	<u>330</u>

→ In the above example, the class frequencies are 25, 53, 77, 95, 80. The total frequency is equal to 330.

* Difference Between Exclusive Series and Inclusive Series.

Exclusive Series	Inclusive Series
1) In exclusive series, the upper limit of a class repeats as the lower limit of next class	1) In inclusive series, the upper limit does not repeat as the lower limit next class
2) In this, value of upper limit of a class is ^{not} included in that class.	2) In this, value of upper limit of a class is included in that class
3) In this, class Interval overlaps. e.g. 10-20, 20-30, 30-40 etc.	3) In this, class interval does not overlap. e.g. 10-19, 20-29, 30-39 etc.

Frequency Distribution Table

39, 45, 50, 45, 36, 50, 52, 44, 38, 38

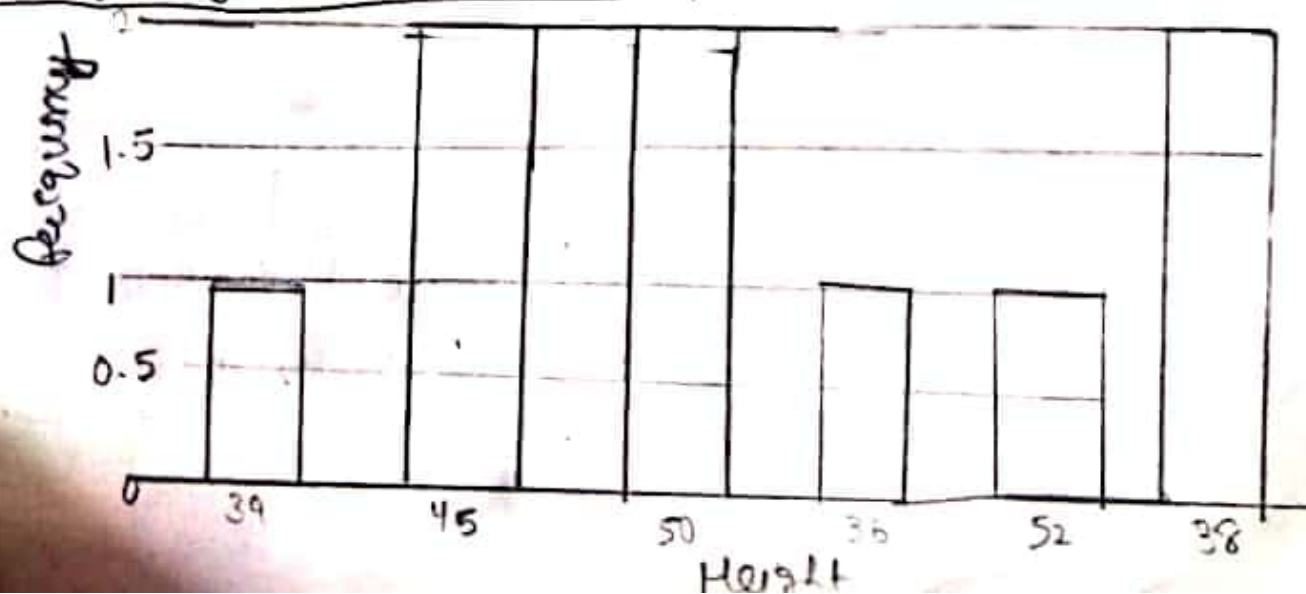
Height	Frequency
39	1
45	2
50	2
36	1
52	1
44	1
38	2

(Tally Marks)

When the data set is too big, we use tally marks for counting. Below is an example of how we use tally marks

1	I	6	I
2	II	7	II
3		8	
4		9	
5		10	

Frequency Distribution Graph



* Cumulative Frequency Distribution.

Cumulative frequency is defined as a running total of frequencies.

→ Cumulative frequency can also be defined as the sum of all previous frequencies up to current point.

example:

Age	Frequency (f)	C.F.
	3	3
10	18	$3+18 = 21$
11	13	$21+13 = 34$
12	12	$34+12 = 46$
13	7	$46+7 = 53$
14	27	$53+27 = 80$
15		

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