



Government of Tamilnadu

Department of Employment and Training

Course : TNPSC Group I Mains Material

Subject : General Aptitude & Mental Ability

Topic : **Parametric representation of data - Analytical Interpretation of data**

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Commissioner,
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Parametric Representation of data

Analytical Interpretation of data

Frequency Polygon

Frequency polygon is drawn after drawing histogram for a given frequency distribution. The area covered under the polygon is equal to the area of the histogram. Vertices of the polygon represent the class frequencies. Frequency polygon helps to determine the classes with higher frequencies. It displays the tendency of the data. The following procedure can be followed to draw frequency polygon:

- (i) Mark the midpoints at the top of each vertical bar in the histogram representing the classes.
- (ii) Connect the midpoints by line segments.

Example

A firm reported that its Net Worth in the years 2011-2016 are as follows:

Year	2011 -2012	2012 - 2013	2013 - 2014	2014 - 2015	2015 - 2016
Net Worth (₹ in lakhs)	100	112	120	133	117

Draw the frequency polygon for the above data

Solution:

Since we are displaying the distribution of Net worth in the years 2011-2016, the Frequency polygon is drawn to determine the classes with higher frequencies. It displays the tendency of the data.

The following procedure can be followed to draw frequency polygon:

Step 1 : Year are marked along the X-axis and labeled as 'Year'.

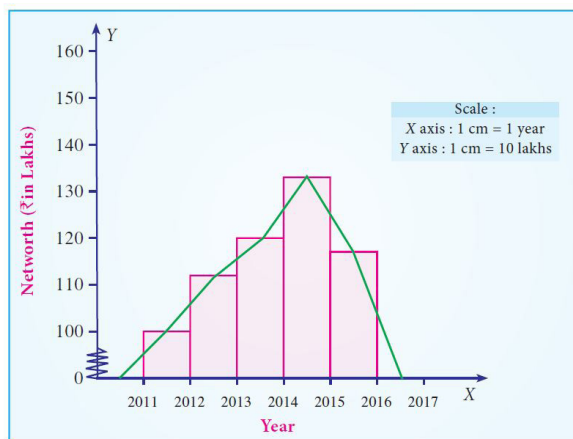
Step 2 : Net worth are marked along the Y-axis and labeled as 'Net Worth (in lakhs of ₹)'.

Step 3 : Mark the midpoints at the top of each vertical bar in the histogram representing the year.

Step 4 : Connect the midpoints by line segments.

Frequency Curve

Frequency curve is a smooth and free-hand curve drawn to represent a frequency distribution. Frequency curve is drawn by smoothing the vertices of the frequency polygon. Frequency curve provides better understanding about the properties of the data than frequency polygon and histogram.



Frequency polygon for Net Worth in the years 2011-2016.

Example

The ages of group of pensioners are given in the table below. Draw the Frequency curve to the following data.

Age	65 - 70	70 - 75	75 - 80	80 - 85	85 - 90
No. of pensioners	38	45	24	10	8

Solution:

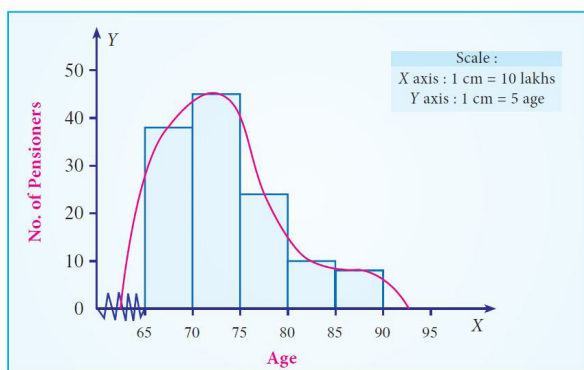
Since we are displaying the distribution of Age and Number of Pensioners, the Frequency curve is drawn, to provide better understanding about the age and number of pensioners than frequency polygon. The following procedure can be followed to draw frequency curve:

Step 1 : Age are marked along the X-axis and labeled as 'Age'.

Step 2 : Number of pensioners are marked along the Y-axis and labeled as 'No. of Pensioners'.

Step3 : Mark the midpoints at the top of each vertical bar in the histogram representing the age.

Step 4 : Connect the midpoints by line segments by smoothing the vertices of the frequency polygon



Frequency curve for Age and No. of pensioners

Cumulative frequency curve (Ogive)

Cumulative frequency curve (Ogive) is drawn to represent the cumulative frequency distribution. There are two types of Ogives such as 'less than Ogive curve' and 'more than Ogive curve'. To draw these curves, we have to calculate the 'less than' cumulative frequencies and 'more than' cumulative frequencies. The following procedure can be followed to draw the ogive curves:

Less than Ogive: Less than cumulative frequency of each class is marked against the corresponding upper limit of the respective class. All the points are joined by a free-hand curve to draw the less than ogive curve.

More than Ogive: More than cumulative frequency of each class is marked against the corresponding lower limit of the respective class. All the points are joined by a free-hand curve to draw the more than ogive curve.

Both the curves can be drawn separately or in the same graph. If both the curves are drawn in the same graph, then the value of abscissa (x-coordinate) in the point of intersection is the median.

Median is a measure of central tendency, which divides the given data/distribution into two equal parts. It is discussed much in detail in Unit V

If the curves are drawn separately, median can be calculated as follows:

Draw a line perpendicular to Y-axis at $y=N/2$. Let it meet the Ogive at C. Then, draw a perpendicular line to X-axis from the point C. Let it meet the X-axis at M. The abscissa of M is the median of the data.

Example

Draw the less than Ogive curve for the following data:

Daily Wages (in ₹)	70- 80	80- 90	90-100	100-110	110-120	120-130	120-130	140-150
No. of workers	12	18	35	42	50	45	20	8

Also, find (i) The Median, (ii) The number of workers whose daily wages are less than ₹ 125.

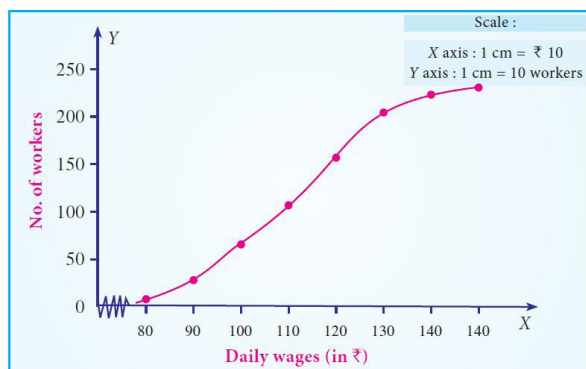
Solution:

Since we are displaying the distribution of Daily Wages and No. of workers, the Ogive curve is drawn, to provide better understanding about the wages and No. of workers.

The following procedure can be followed to draw Less than Ogive curve:

- Step 1 : Daily wages are marked along the X-axis and labeled as “Wages(in `)”.
- Step 2 : No. of Workers are marked along the Y-axis and labeled as “No. of workers”.
- Step 3 : Find the less than cumulative frequency, by taking the upper class-limit of daily wages. The cumulative frequency corresponding to any upper class-limit of daily wages is the sum of all the frequencies less than the limit of daily wages.
- Step 4 : The less than cumulative frequency of Number of workers are plotted as points against the daily wages (upper-limit). These points are joined to form less than ogive curve.

Daily wages (less than)	No of workers
80	12
90	30
100	65
110	107
120	157
130	202
140	222
150	230



Less than Ogive curve for daily wages and number of workers.

- (i) Median = ₹ 120
- (ii) 183 workers get daily wages less than ₹ 125

Example

The yield of mangoes were recorded (in kg) are given below:

Graphically,

- (i) find the number of trees which yield mangoes of less than 55 kg.
- (ii) find the number of trees from which mangoes of more than 75 kg.
- (iii) find the median.

Draw the Less than and More than Ogive curves. Also, find the median using the Ogive curves

Yield (in kg)	No. of trees
40 - 50	10
50 - 60	15
60 - 70	17
70 - 80	14
80 - 90	12
90 - 100	2
Total	70

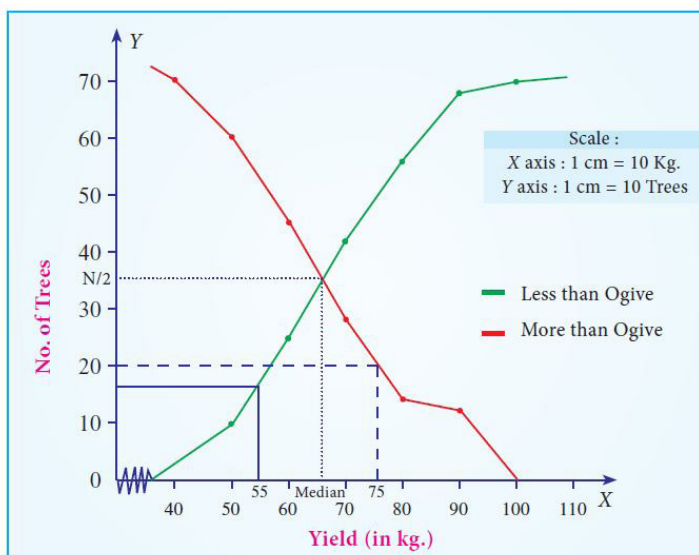
Solution:

Since we are displaying the distribution of Yield and No. of trees, the Ogive curve is drawn, to provide better understanding about the Yield and No. of trees. The following procedure can be followed to draw Ogive curve:

- Step 1 : Yield of mangoes are marked along the X-axis and labeled as 'Yield (in Kg.)'.
- Step 2 : No. of trees are marked along the Y-axis and labeled as 'No. of trees'.
- Step 3 : Find the less than cumulative frequency, by taking the upper class-limit of Yield of mangoes. The cumulative frequency corresponding to any upper class-limit of Mangoes is the sum of all the frequencies less than the limit of mangoes.
- Step 4 : Find the more than cumulative frequency, by taking the lower class-limit of Yield of mangoes. The cumulative frequency corresponding to any lower class-limit of Mangoes is the sum of all the frequencies above the limit of mangoes.
- Step 5 : The less than cumulative frequency of Number of trees are plotted as points against the yield of mangoes (upper-limit). These points are joined to form less than ogive curve.

Step 6 : The more than cumulative frequency of Number of trees are plotted as points against the yield of mangoes (lower-limit). These points are joined to form more than O give curve.

Less than Ogive		More than Ogive	
Yield less than	No. of trees	Yield greater than	No. of trees
50	10	40	70
60	25	50	60
70	42	60	45
80	56	70	28
90	68	80	14
100	70	90	2



Ogive curve for Yield of mangoes and number of trees.

- (i) 16 trees yield less than 55 kg
- (ii) 20 trees yield more than 75 kg
- (iii) Median = 66 kg