Arithmetical presentation. a-Central tendency measurements

Graphical Representation. is a way of analyzing numerical data. It exhibits the relation between data, ideas, information and concepts in a diagram. It is easy to understand and it is one of the most important learning strategies. It always depends on the type of information in a particular domain. There are different types of graphical representation. Some of them are as follows:

Line Graphs. Line graph or the linear graph is used to display the continuous data and it is useful for predicting future events over time.

Bar Graphs: Bar Graph is used to display the category of data and it compares the data using solid bars to represent the quantities.
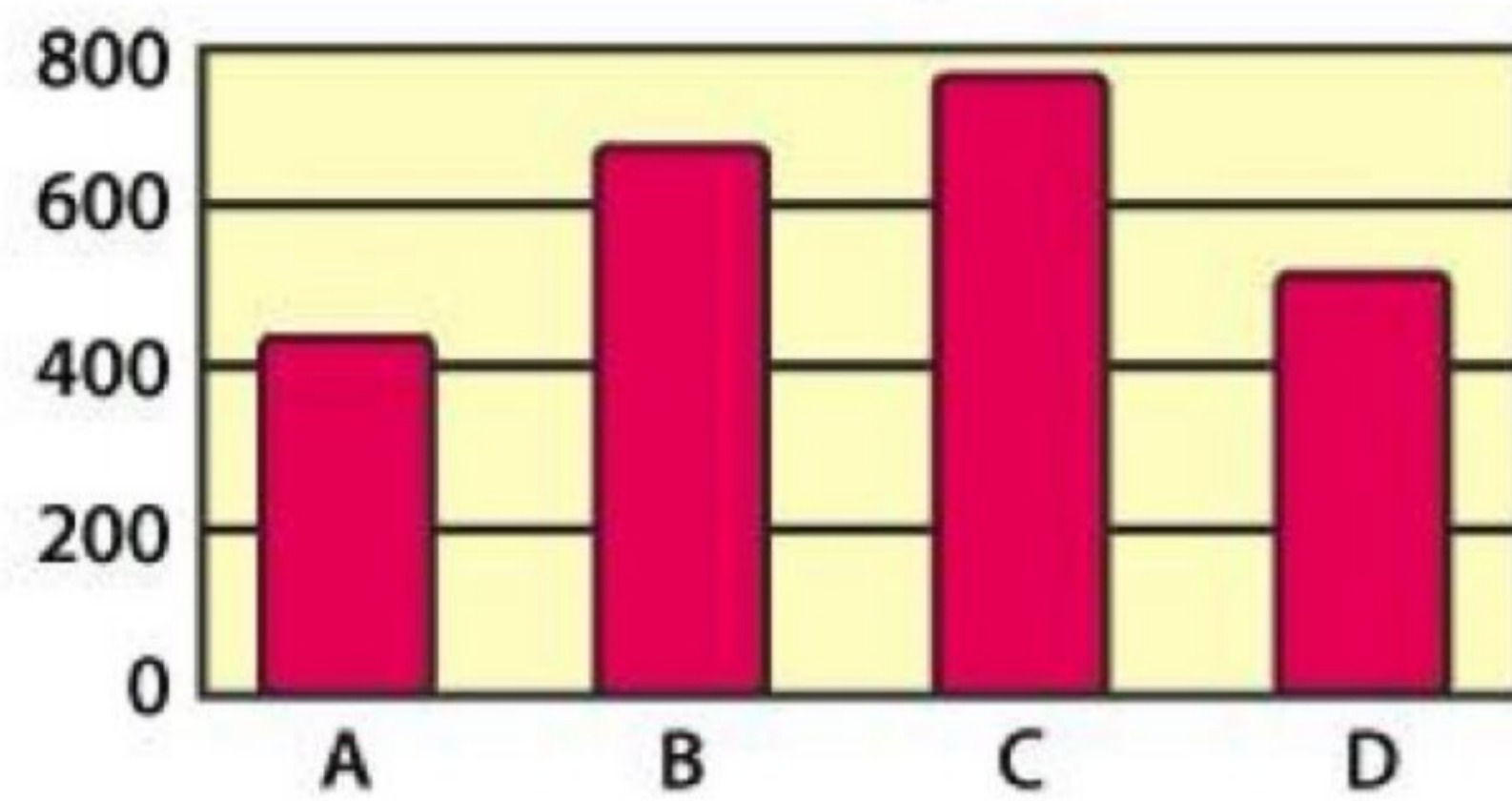
Histograms: The graph that uses bars to represent the frequency of numerical data that are organized into intervals. Since all the intervals are equal and continuous, all the bars have the same width.

Line Plot: It shows the frequency of data on a given number line. 'x' is placed above a number line each time when that data occurs again.
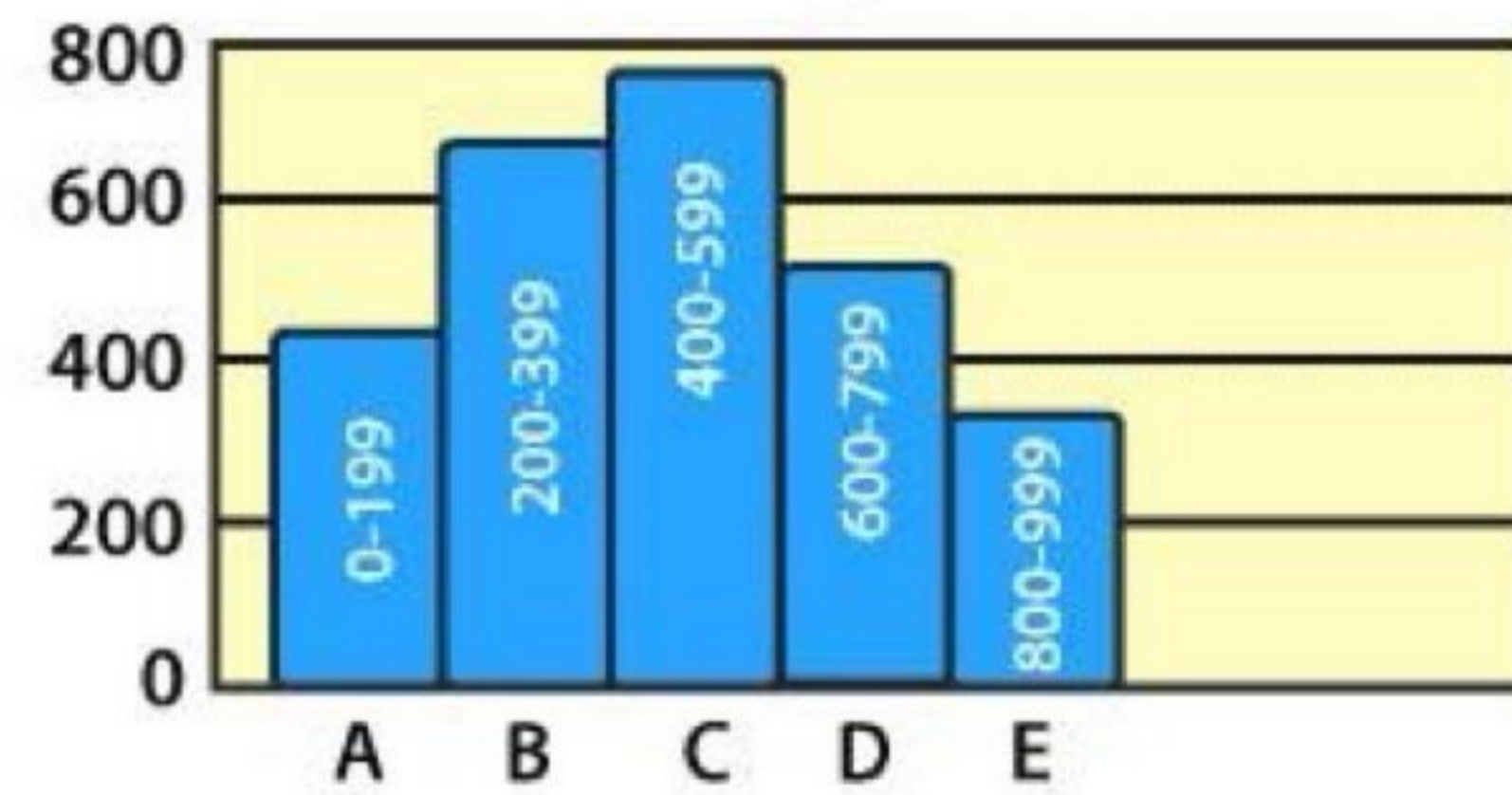
Circle Graph: Also known as the pie chart that shows the relationships of the parts of the whole. The circle is considered with 100% and the categories occupied is represented with that specific percentage like 15%, 56%, etc.
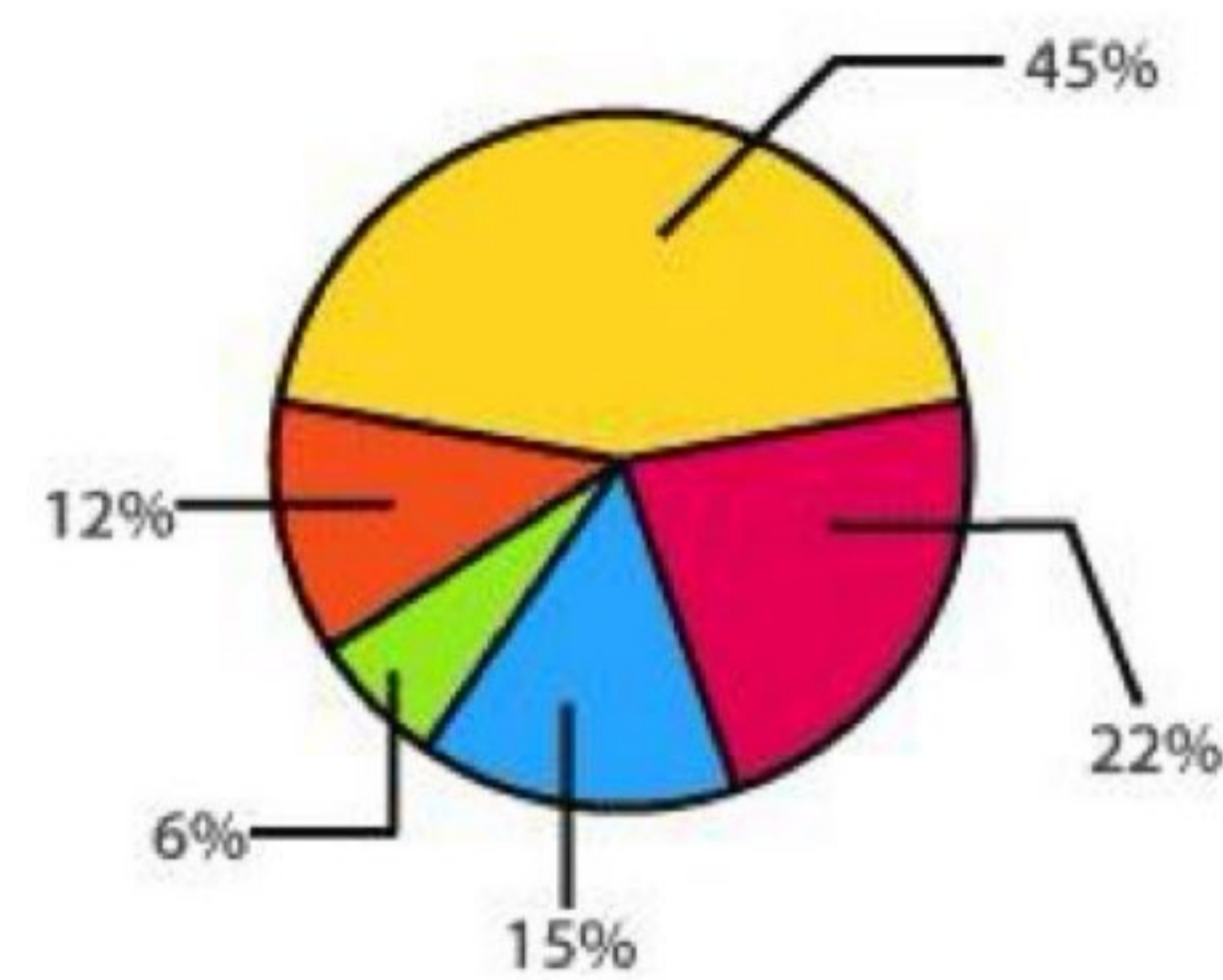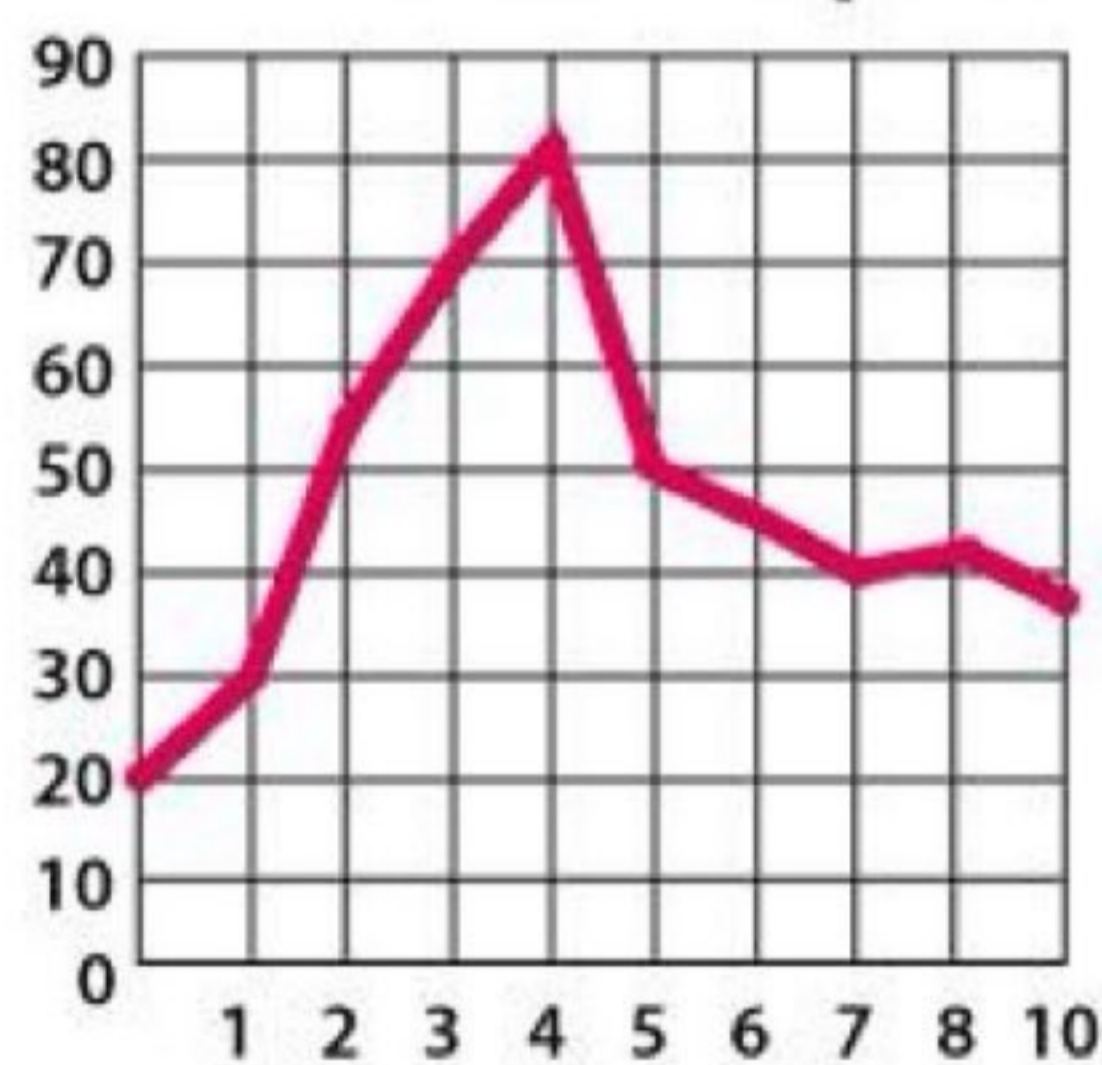
TYPES OF GRAPHICAL REPRESENTATION

Bar Graphs

800	
600	
400	
200	
0	A B C D

Histograms

800	
600	400-599
400	200-399 600-799
200	0-199 800-999
0	A B C D E

Frequency Table

Rulers of France		
Reign (Years)	Tally	Frequency
1-15	~~IIII~~ ~~IIII~~ ~~IIII~~ III	18
16-30	~~IIII~~ ~~IIII~~ I	11
31-45	~~IIII~~ I	6
46-60	IIII	4
61-75	I	1

Circle Graph

45%
12%
6%
15%
22%

Line Graphs

90
80
70
60
50
40
30
20
10
0
1 2 3 4 5 6 7 8 10

Stem and Leaf Plot

Stem	Leaf
0	1, 1, 2, 2, 3, 4, 4, 4, 4, 5, 8
1	0, 0, 0, 1, 1, 3, 7, 9
2	5, 5, 7, 7, 8, 8, 9, 9
3	0, 1, 1, 1, 2, 2, 2, 4, 5
4	0, 4, 8, 9
5	2, 6, 7, 7, 8
6	3, 6

Key : 6 | 3 = 63 Year

Line Plot

1 2 3 4 5 6 7 8 9

Box and Whisker Plot

20 30 40 50 60 70 80 90

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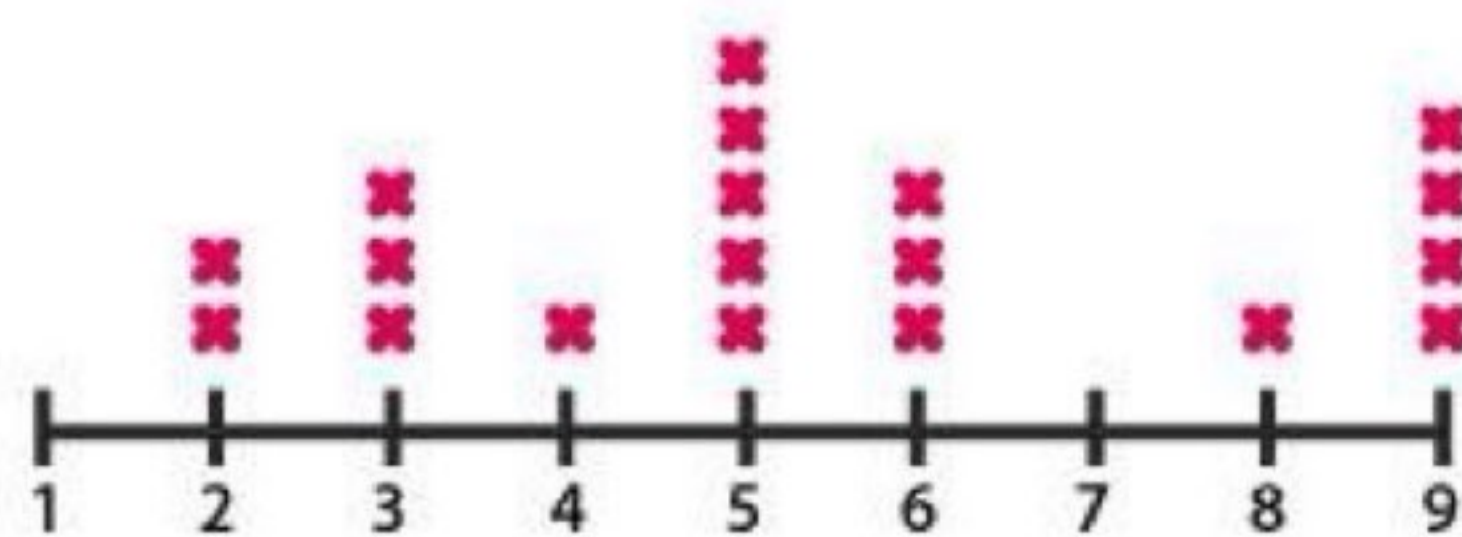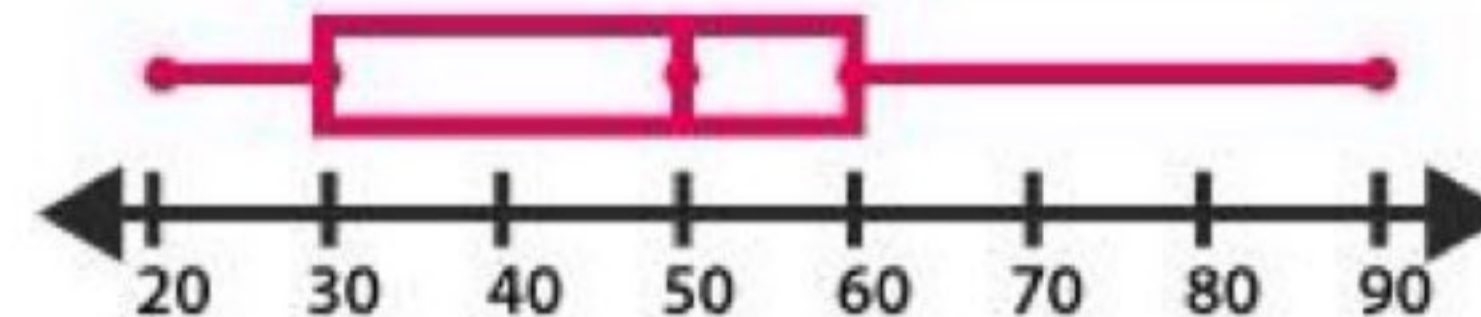
General Rules for Graphical Representation of Data

There are certain rules to effectively present the information in the graphical representation. They are:

1- Suitable Title: Make sure that the appropriate title is given to the graph which indicates the subject of the presentation.

2- Measurement Unit: Mention the measurement unit in the graph.

3- Proper Scale: To represent the data in an accurate manner, choose a proper scale.

4- Index: Index the appropriate colors, shades, lines, and design in the graphs for better understanding.

5- Data Sources: Include the source of information wherever it is necessary at the bottom of the graph.

6- Keep it Simple: Construct a graph in an easy way that everyone can understand.

7- Neat: Choose the correct size, fonts, colors.. etc in such a way that the graph should be a visual aid for the presentation of information

Cumulative distribution: Technically, a cumulative frequency distribution is the sum of the class and all classes below it in a frequency distribution. All that means is you're adding up a value and all of the values that came before it.

Type	Freq	cumulative frequency
Up to 1000	22	22
1001-2000	45	67
2001-3000	57	124
3001-4000	97	221
4001-5000	152	373
5001-6000	241	614
6001-7000	153	767

Frequency polygon: A frequency polygon is a line graph of class frequency plotted against class midpoint. It can be obtained by joining the midpoints of the tops of the rectangles in the histogram

Histogram: is a graphical representation that organizes a group of data points into user-specified ranges. Similar in appearance to a bar graph, the histogram condenses a data series into an easily interpreted visual by taking many data points and grouping them into logical ranges or bins.

Difference between Frequency Polygons and Histogram

Even though a frequency polygon graph is similar to a histogram and can be plotted with or without a histogram, the two graphs are yet different from each other. The two graphs have their own unique properties that show the difference visually. The differences are:

Frequency Polygons	Histograms
A frequency polygon graph is a curve that is depicted by a line segment.	A histogram is a graph that depicts data through rectangular-shaped bars with no spaces between them.
In a frequency polygon graph, the midpoint of the frequencies is used.	In a histogram, the frequencies are evenly spread over the class intervals.

The accurate points in a frequency polygon graph represent the data of the particular class interval.	The height of the bars in a histogram only depicts the quantity of the data.
Comparison of data is visually more accurate in a frequency polygon graph.	Comparison of data is not visually appealing in a histogram graph.

Example: In a city, the weekly observations made in a study on the cost of a living index are given in the following table: Draw a frequency polygon for the data below with a histogram.

Cost of Living Index	Number of weeks
140 - 150	2
150 - 160	8
160 - 170	14
170 - 180	20
180 - 190	10
190 - 200	6
Total	60

Solution: To plot a frequency polygon with a histogram, we need to follow these steps to construct a histogram:

- The cost-of-living index is represented on the x-axis.
- The number of weeks is represented on the y-axis.
- Now rectangular bars of widths equal to the class- size and the length of the bars corresponding to a frequency of the class interval are drawn.

To calculate the midpoint, we use the formula

Class mark = (Upper Limit + Lower Limit) / 2

So, class mark = (150 + 140)/2 = 145, (160 + 150)/2 = 155 and so on

Cost of Living Index	Number of weeks	Class mark
140 - 150	2	145
150 - 160	8	155
160 - 170	14	165
170 - 180	20	175
180 - 190	10	185
190 - 200	6	195
Total	60	

While plotting the graph, we also mark the before and after class mark as well. In this case, the before is 135 and the after is 205. ABCDEFGH represents the given data graphically in form of frequency polygon i.e., those are the midpoints. Hence, the frequency polygons graph will look like this:
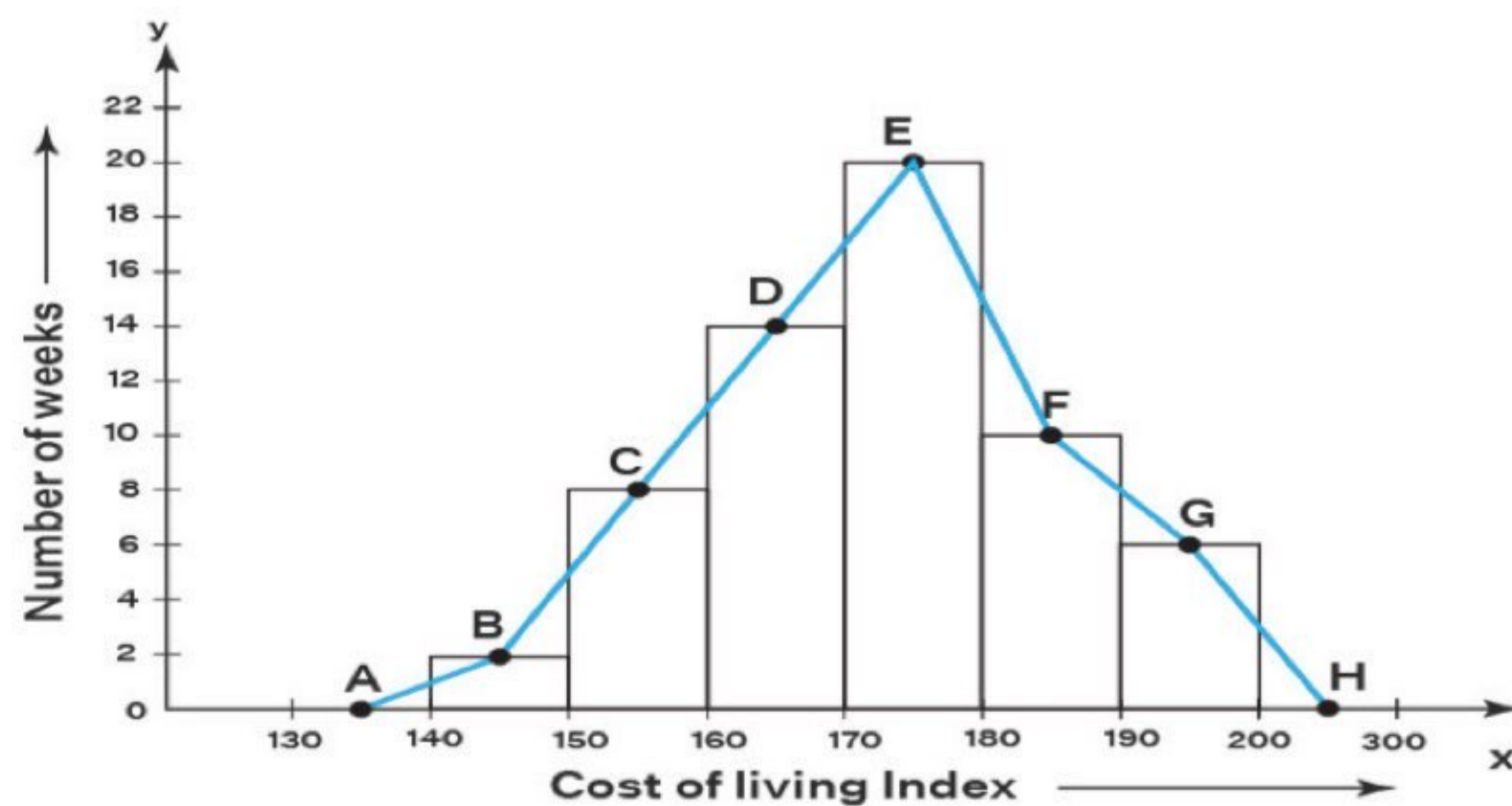
Frequency curve: A frequency curve is a smooth curve for which the total area is taken to be unity. It is a limiting form of a histogram or frequency polygon. The frequency curve for a distribution can be obtained by drawing a smooth and free hand curve through the midpoints of the upper sides of the rectangles forming the histogram.

We will use the following process to draw the frequency curve:

1) We will plot the histogram for the data values.

2) Then, we will point the midpoints of the class interval on the histogram.

3) Now we will join the midpoints using the straight lines.

4) The graph joined by using straight lines is called frequency polygon

Types of Frequency Curves: There exist four types of frequency curves namely, Bell-shaped curve, U-shaped curve, J-shaped curve and Mixed curve.
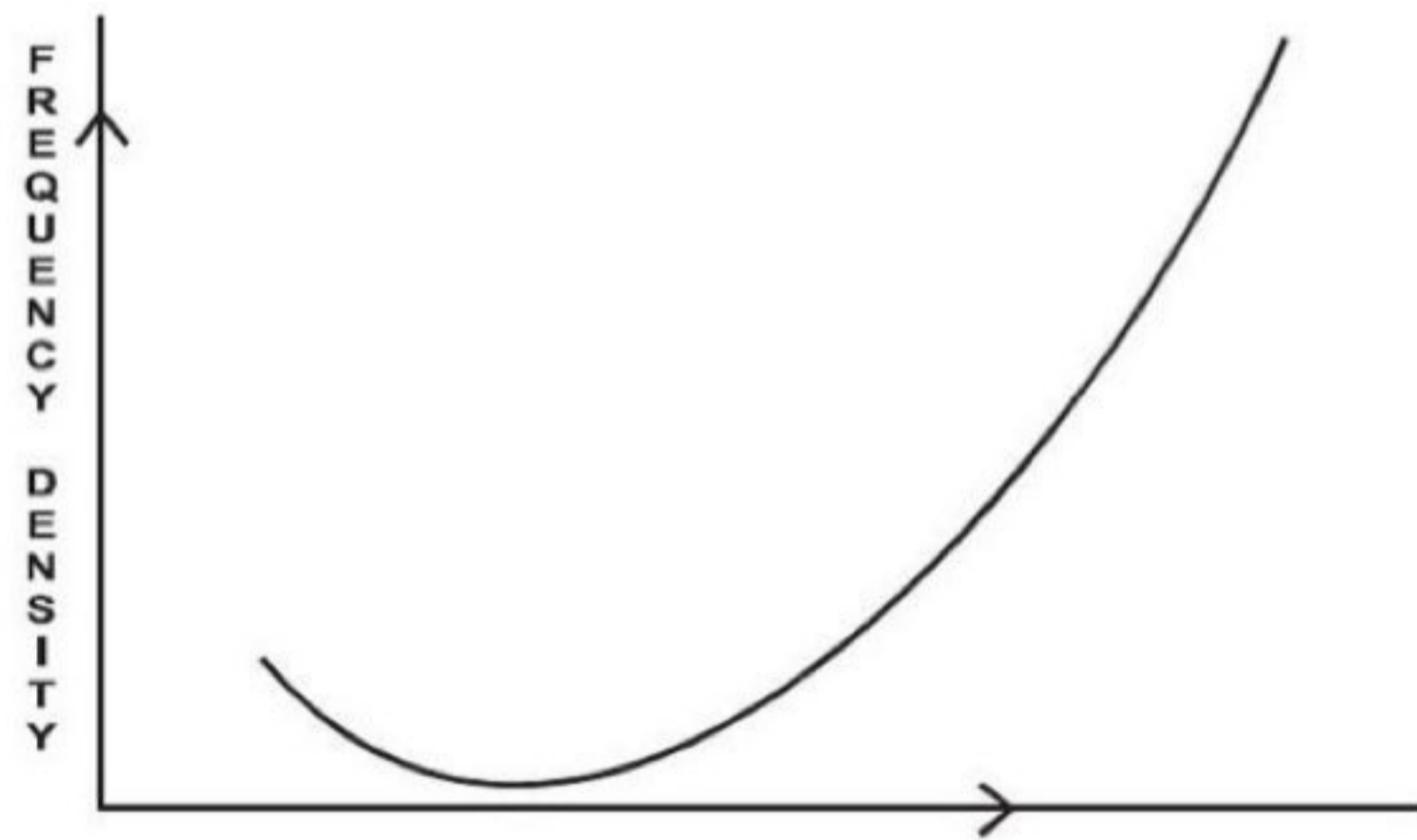
Bell - Shaped Curve

CLASS BOUNDARY
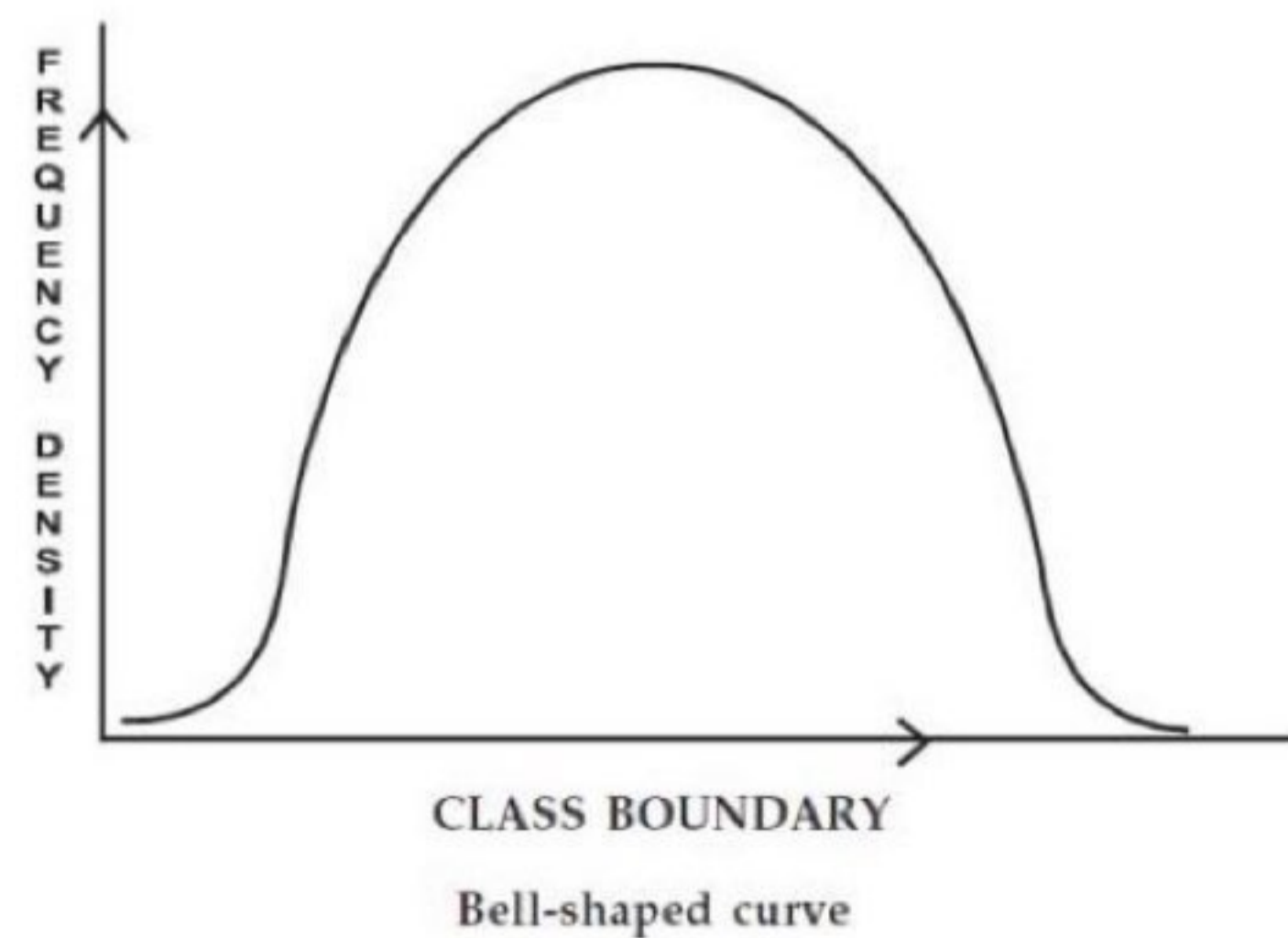
Bell-shaped curve
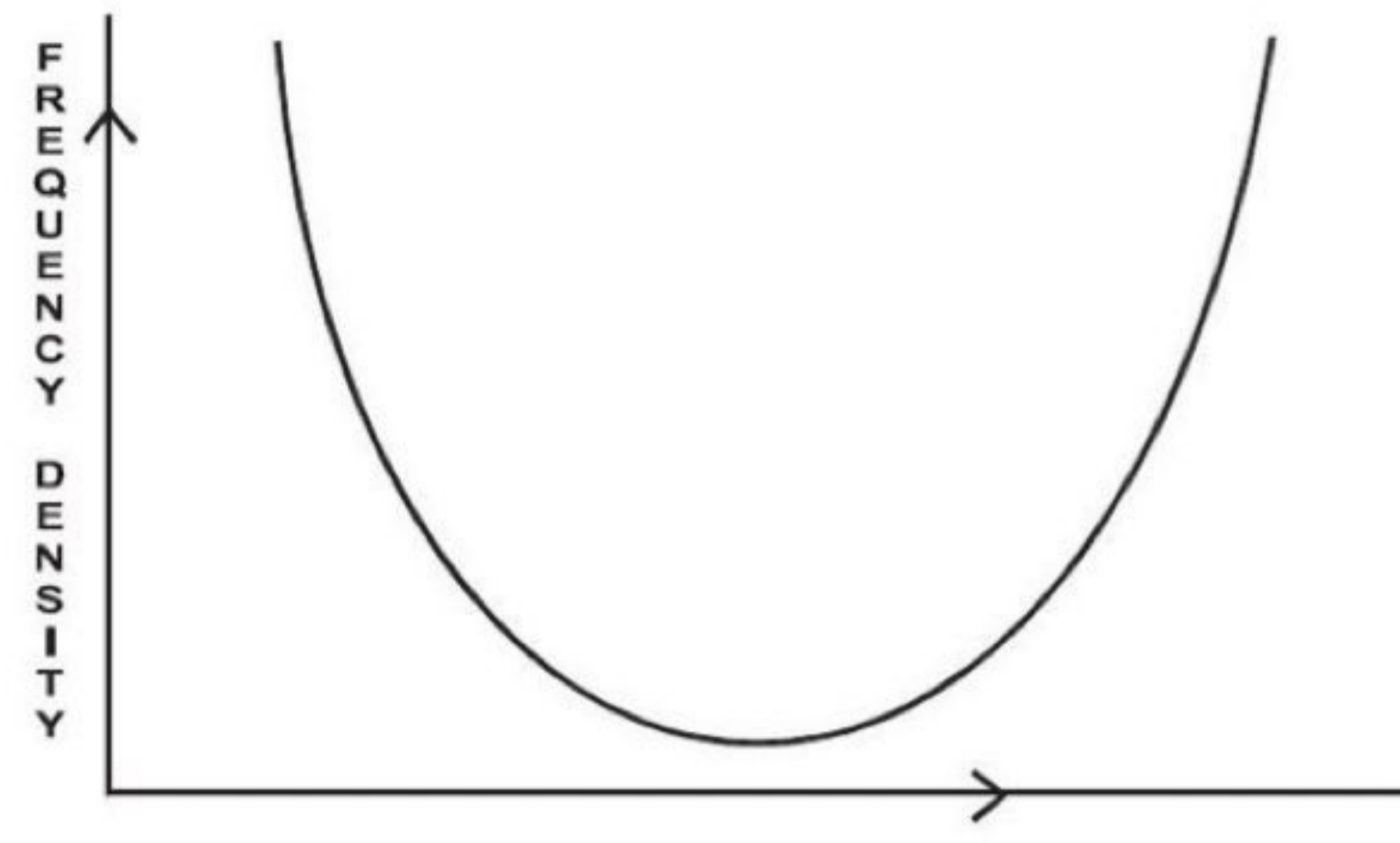
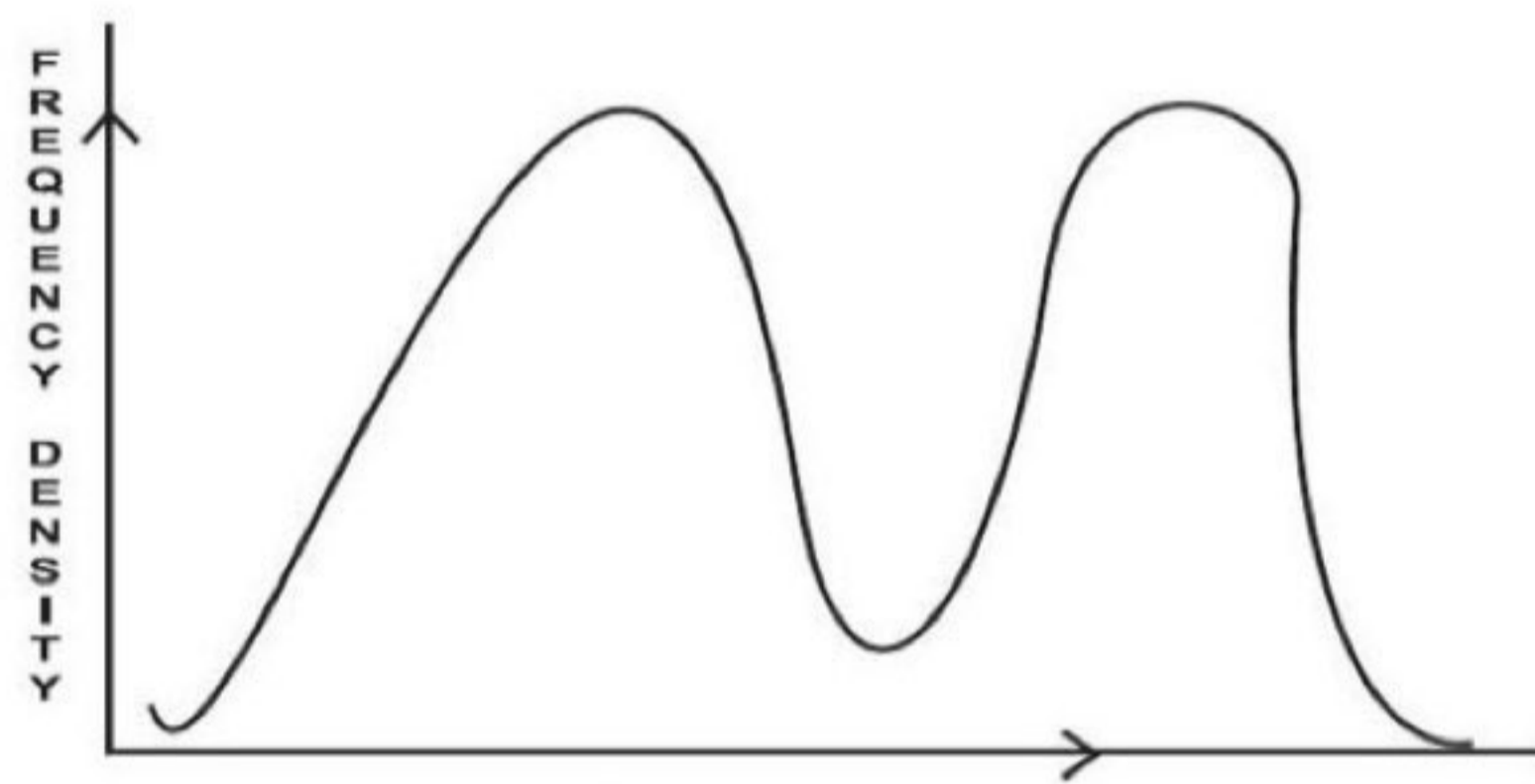## U - Shaped Curve

CLASS BOUNDARY

U-shaped curve

J - Shaped Curve

CLASS BOUNDARY

J-shaped curve

Mixed Curve

CLASS BOUNDARY

Mixed Curve