QUANTITATIVE METHODS

MODULE CODE: BIT 125

WELCOME

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LECTURER

TEXAS COLLEGE OF MANAGEMENT AND IT

COURSE CONTENTS

CHAPTER 04

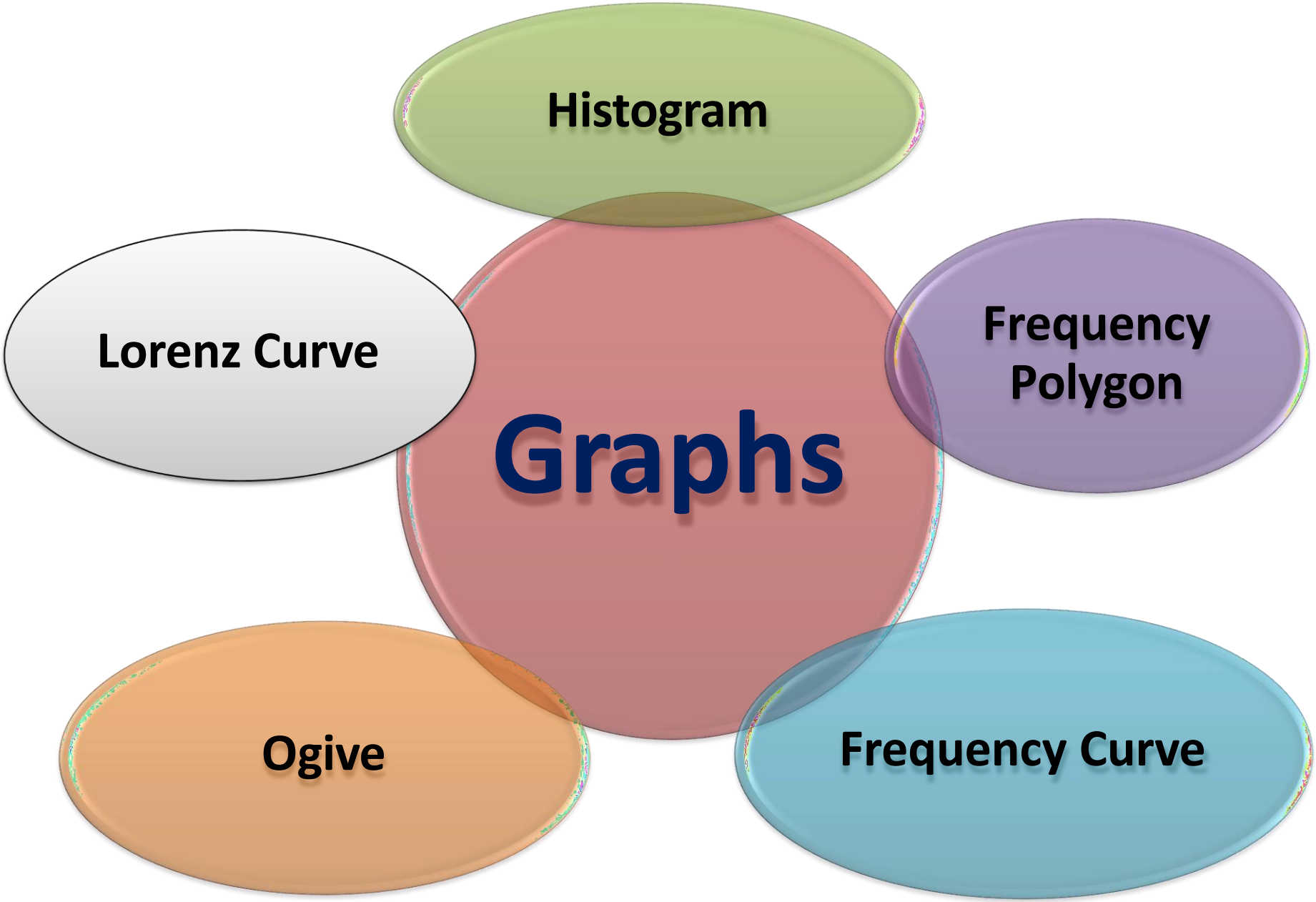
DIAGRAMMATIC AND GRAPHIC PRESENTATION OF DATA

- ☐ Importance and limitations
- ☐ Types of diagrammatic representations: bar diagram, pie diagram; pictogram
- ☐ Types of graphical representations: histogram, frequency polygon, frequency curve, cumulative frequency curve (Ogive)

5 Lecture Hours

Graphical Representation

- A graph is a visual form of presentation of statistical data.
- A graph is more attractive than a table of figure. Even a common man can understand the message of data from the graph.
- Comparisons can be made between two or more phenomena very easily with the help of a graph.


Histogram
Lorenz Curve
Graphs
Frequency Polygon
Ogive
Frequency Curve

1. Histogram

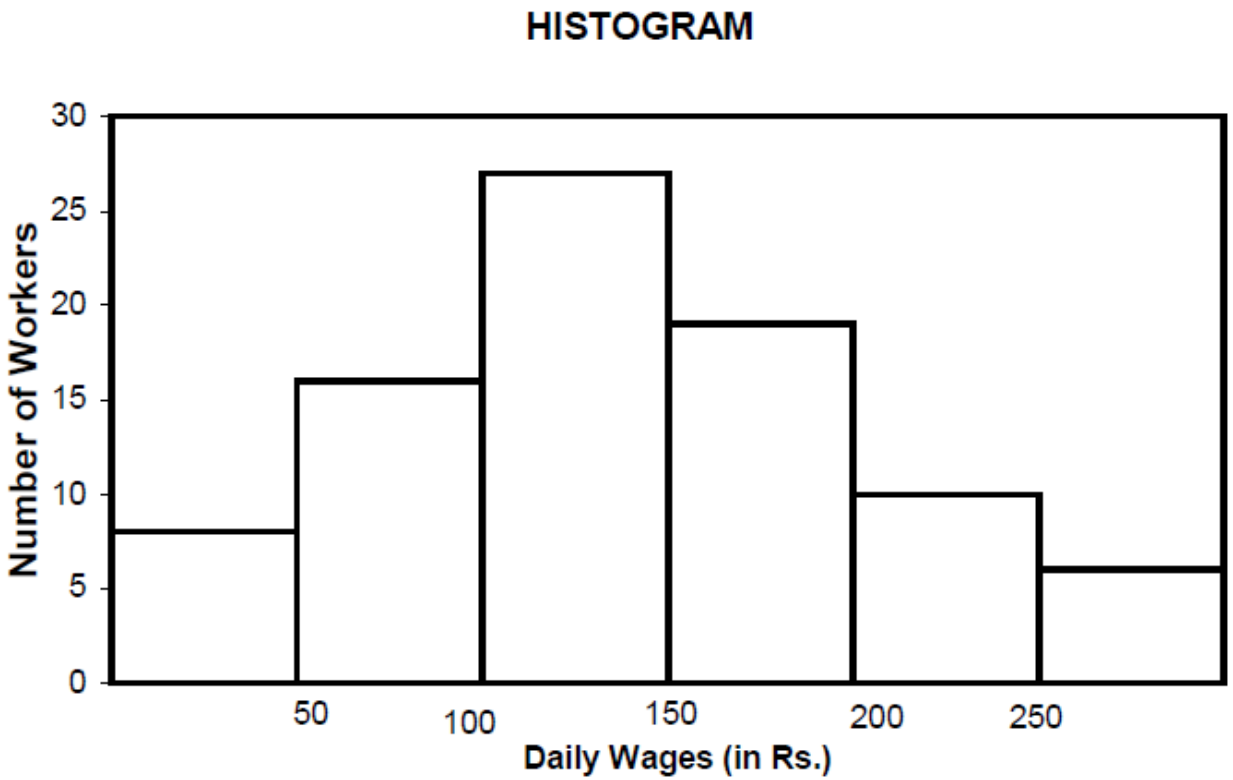
- A histogram is a bar chart or graph showing the frequency of occurrence of each value of the variable being analyzed.
- In histogram, data are plotted as a series of rectangles. Class intervals are shown on the 'X-axis' and the frequencies on the 'Y-axis'.
- The height of each rectangle represents the frequency of the dass interval. Each rectangle is formed with the other so as to give a continuous picture. Such a graph is also called staircase or block diagram.
- we cannot construct a histogram for distribution with open- end dasses. It is also quite misleading if the distribution has unequal intervals and suitable adjustments in frequencies are not made.

Example 10:

Draw a histogram for the following data.

Daily Wages	Number of Workers
0-50	8
50-100	16
100-150	27
150-200	19
200-250	10
250-300	6

Solution:

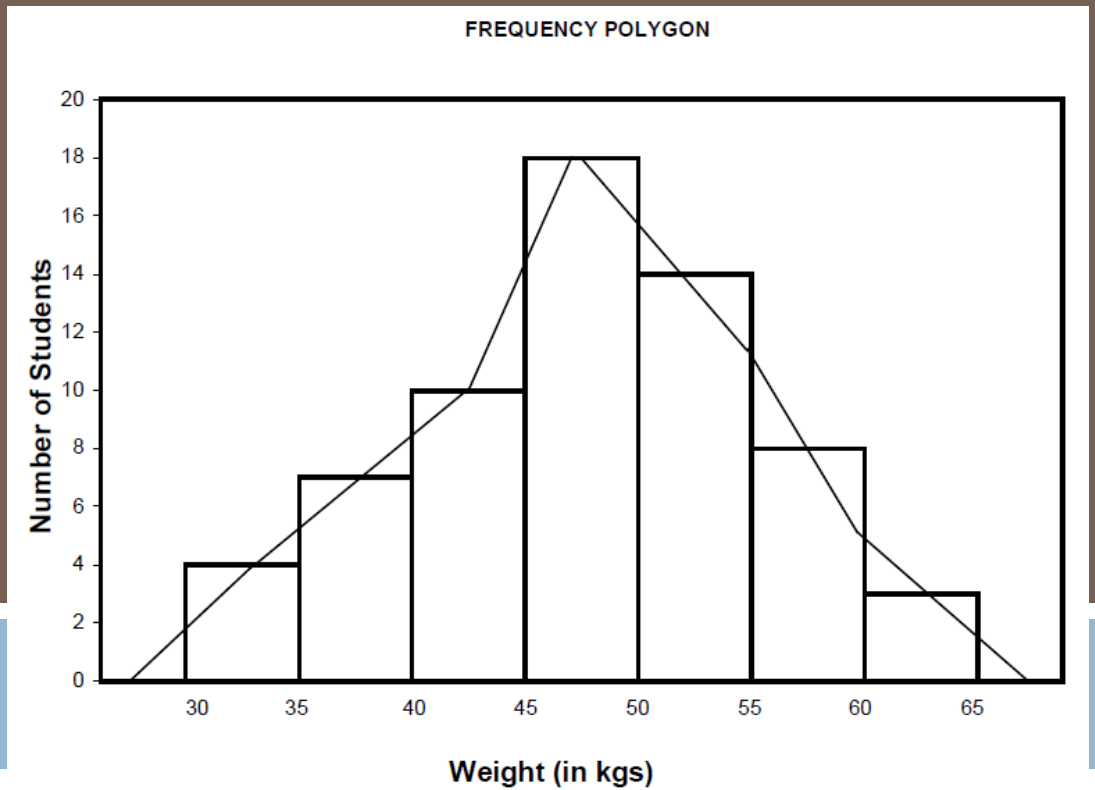


2. Frequency Polygon

- If we mark the midpoints of the top horizontal sides of the rectangles in a histogram and join them by a straight line, the figure so formed is called a Frequency Polygon.
- This is done under the assumption that the frequencies in a class interval are evenly distributed throughout the class.
- The area of the polygon is equal to the area of the histogram, because the area left outside is just equal to the area included in it.

Example 13:
Draw a frequency polygon for the following data.

Weight (in kg)	Number of Students
30-35	4
35-40	7
40-45	10
45-50	18
50-55	14
55-60	8
60-65	3



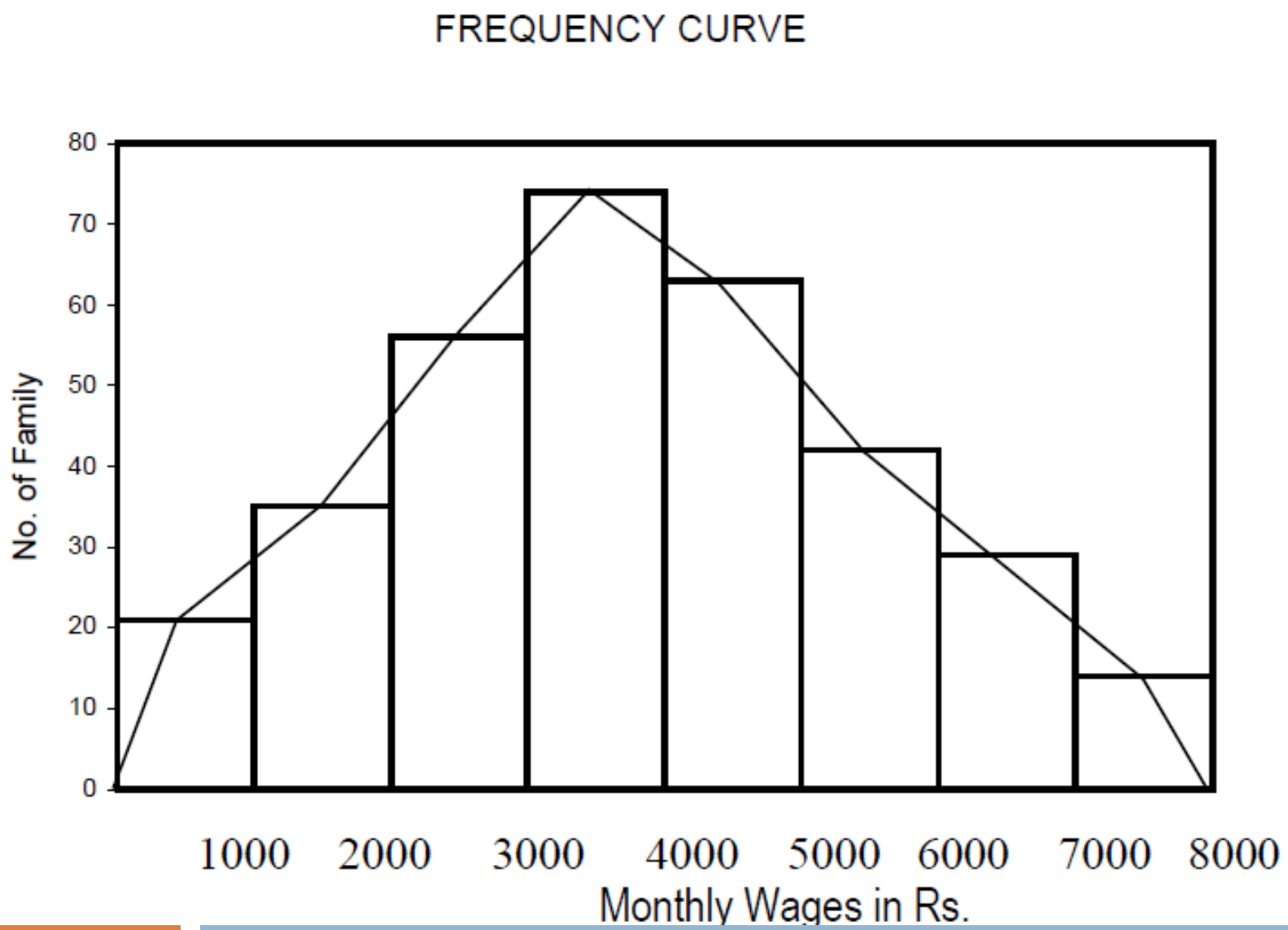
3. Frequency Curve

- If the middle point of the upper boundaries of the rectangles of a histogram is corrected by a smooth freehand curve, then that diagram is called frequency curve.
- The curve should begin and end at the base line.

Example 14:
Draw a frequency curve for the following data.

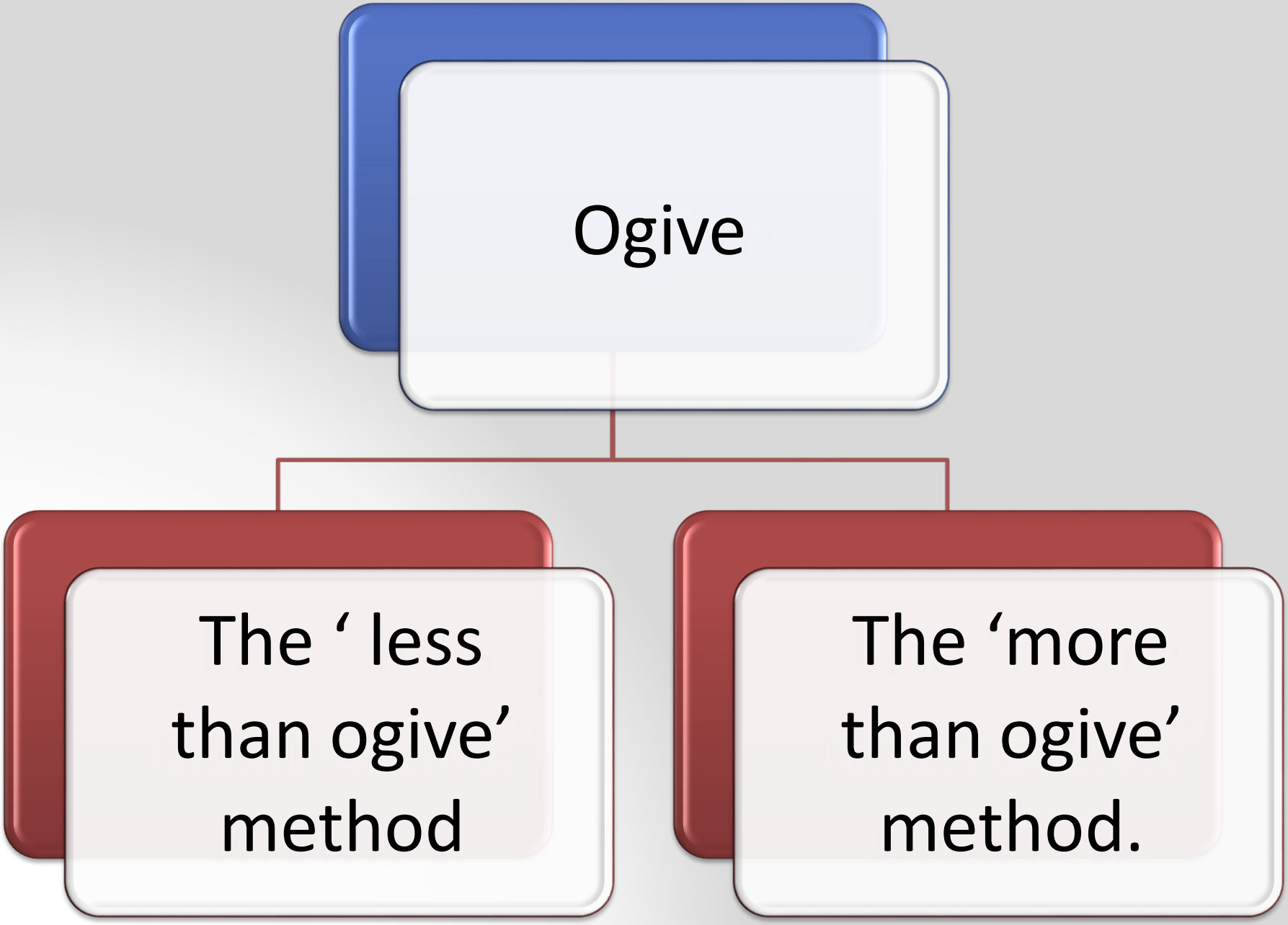
Monthly Wages (in Rs.)	No. of family
0-1000	21
1000-2000	35
2000-3000	56
3000-4000	74
4000-5000	63
5000-6000	40
6000-7000	29
7000-8000	14

Solution:


FREQUENCY CURVE
No. of Family
80
70
60
50
40
30
20
10
0
1000
2000
3000
4000
5000
6000
7000
8000
Monthly Wages in Rs.

4. Ogives

- For a set of observations, we know how to construct a frequency distribution. In some cases we may require the number of observations less than a given value or more than a given value.
- This is obtained by a accumulating (adding) the frequencies upto (or above) the give value. This accumulated frequency is called **cumulative frequency**.
- These cumulative frequencies are then listed in a table is called cumulative frequency table. The curve table is obtained by plotting cumulative frequencies is called a **cumulative frequency curve or an ogive**.


Ogive
The ‘ less than ogive’ method
The ‘more than ogive’ method.

- **In less than ogive method** we start with the upper limits of the classes and go adding the frequencies. When these frequencies are plotted, we get a rising curve.

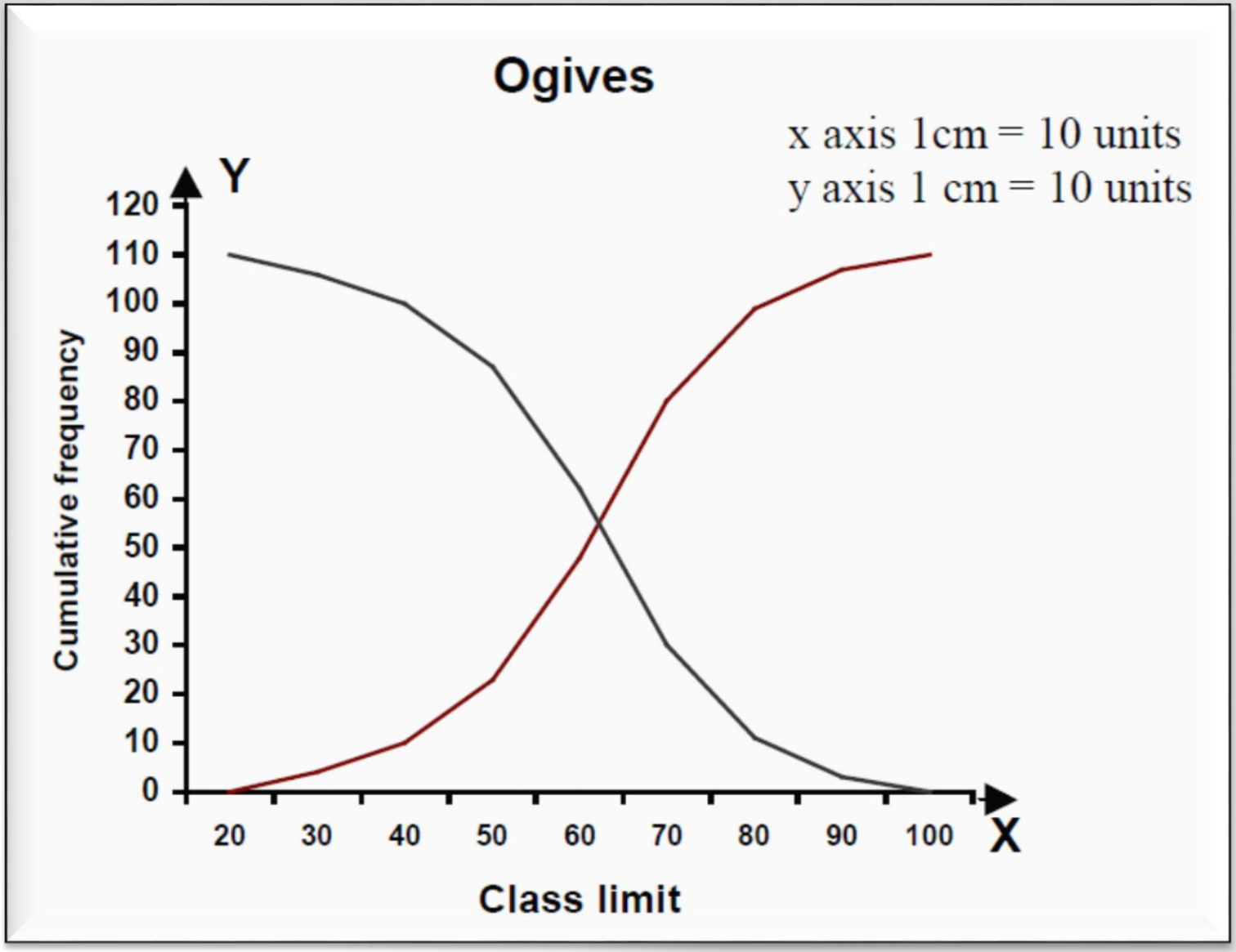
- **In more than ogive method**, we start with the lower limits of the classes and from the total frequencies we subtract the frequency of each class. When these frequencies are plotted we get a declining curve.

Example 15:

Draw the Ogives for the following data.

Class interval	Frequency
20-30	4
30-40	6
40-50	13
50-60	25
60-70	32
70-80	19
80-90	8
90-100	3

Class limit	Less than ogive	More than ogive
20	0	110
30	4	106
40	10	100
50	23	87
60	48	62
70	80	30
80	99	11
90	107	3
100	110	0


Ogives
x axis 1cm = 10 units
y axis 1 cm = 10 units
Y
120
110
100
90
80
70
60
50
40
30
20
10
0
Cumulative frequency
20
30
40
50
60
70
80
90
100
X
Class limit

5. Lorenz Curve

- Lorenz curve is a graphical method of studying dispersion. It was introduced by **Max.O.Lorenz**, a great Economist and a statistician, to study the distribution of wealth and income.
- It is also used to study the variability in the distribution of profits, wages, revenue, etc.
- It is specially used to study the degree of inequality in the distribution of income and wealth between countries or between different periods.
- It is a percentage of cumulative values of one variable in combined with the percentage of cumulative values in other variable and then Lorenz curve is drawn.

Lorenz Curve (Cont)

- The curve starts from the origin (0,0) and ends at (100,100). If the wealth, revenue, land etc are equally distributed among the people of the country, then the Lorenz curve will be the diagonal of the square. But this is highly impossible.

- The deviation of the Lorenz curve from the diagonal, shows how the wealth, revenue, land etc are not equally distributed among people.

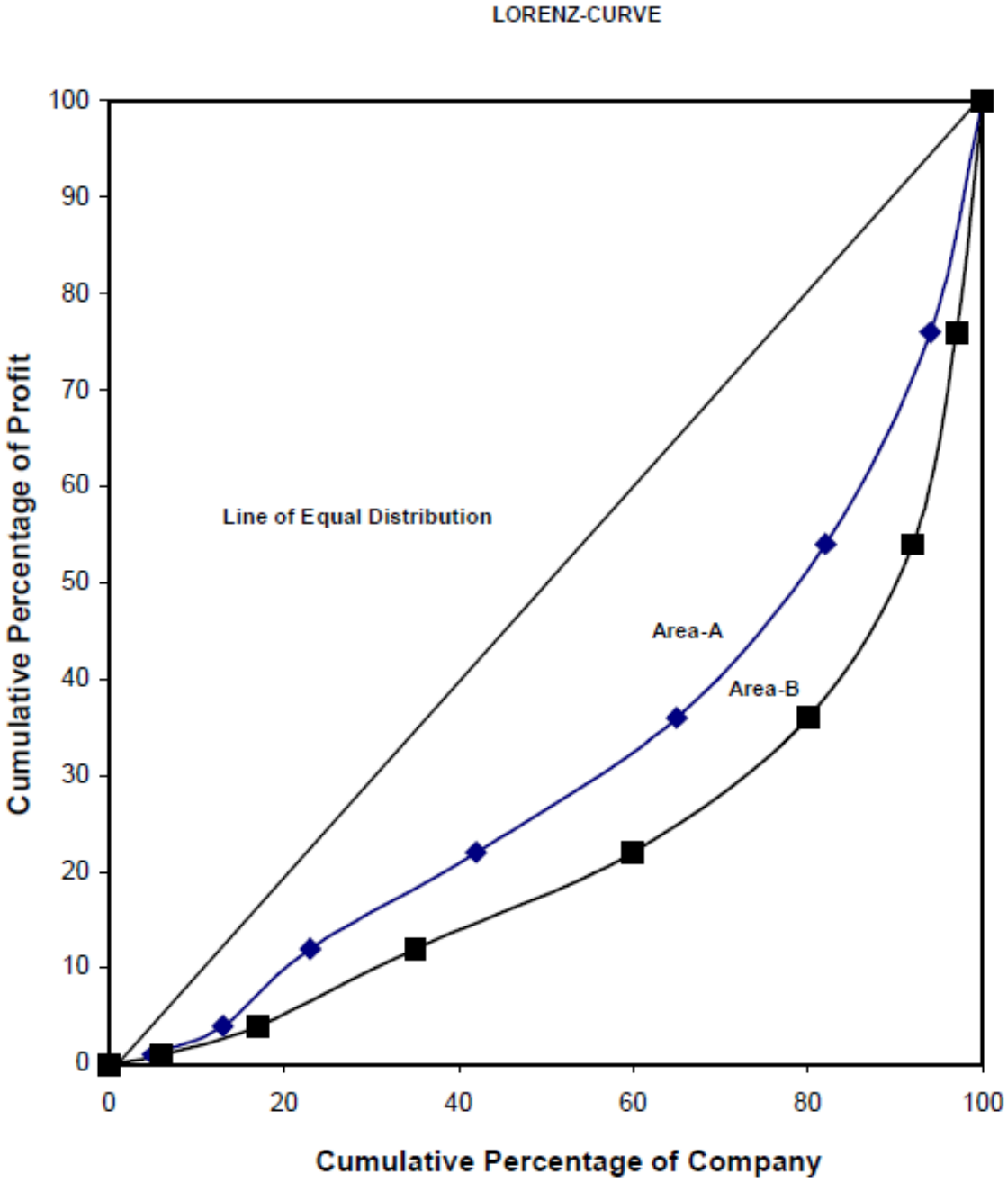
Example 16:

In the following table, profit earned is given from the number of companies belonging to two areas A and B. Draw in the same diagram their Lorenz curves and interpret them.

Profit earned (in thousands)	Number of Companies	
	Area A	Area B
5	7	13
26	12	25
65	14	43
89	28	57
110	33	45
155	25	28
180	18	13
200	8	6

Solution:

Profits			Area A			Area B		
In Rs.	Cumulative profit	Cumulative percentage	No. of companies	Cumulative number	Cumulative percentage	No. of companies	Cumulative number	Cumulative percentage
5	5	1	7	7	5	13	13	6
26	31	4	12	19	13	25	38	17
65	96	12	14	33	23	43	81	35
89	185	22	28	61	42	57	138	60
110	295	36	33	94	65	45	183	80
155	450	54	25	119	82	28	211	92
180	630	76	18	137	94	13	224	97
200	830	100	8	145	100	6	230	100


LORENZ-CURVE
Cumulative Percentage of Profit
100
90
80
70
60
50
40
30
20
10
0
Line of Equal Distribution
Area-A
Area-B
0
20
40
60
80
100
Cumulative Percentage of Company


Backspace
Page Up
Home
Thank You
Texas
College of Mgmt & IT
Page Down
Shift