

Application of Computer in Health Research

Lecture 5-6

Prepared by Dr. Ibrahim AL-Jaafari

Organizing and Displaying Data

Quantitative Data

- **Graphing Grouped Data**
 - Histograms
 - Polygons

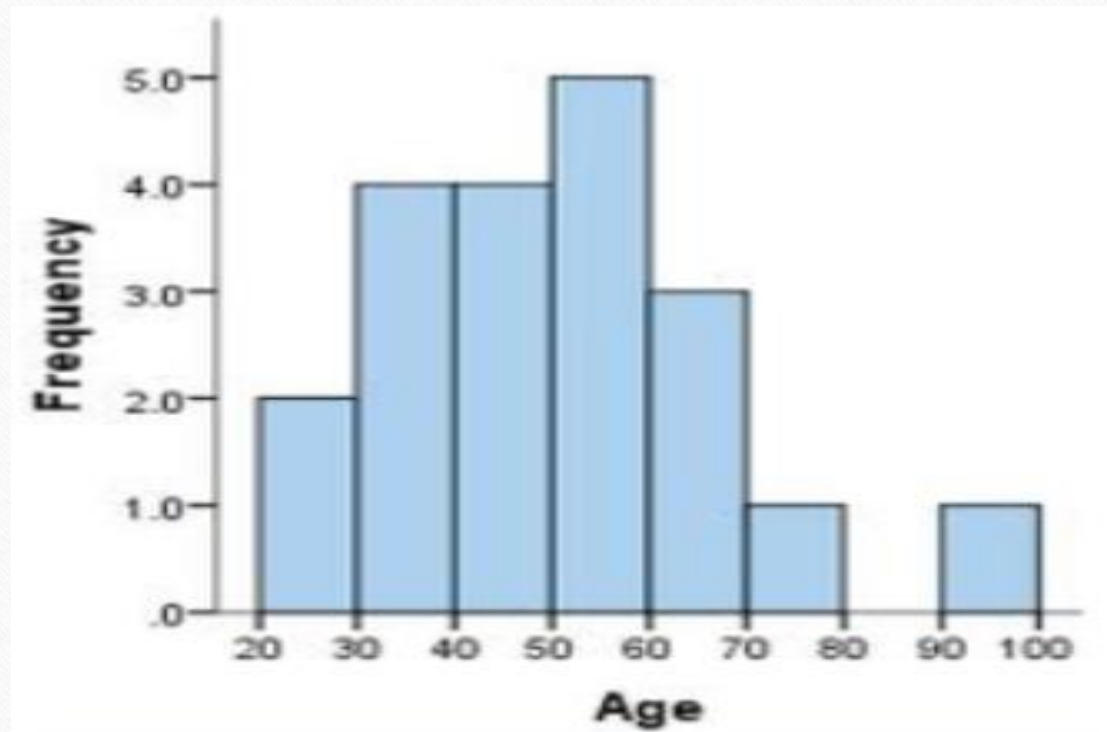
GRAPHING QUANTITATIVE DATA

How to present quantitative data ??

1- Histograms / a graph in which classes are marked on horizontal axis and the frequencies are marked on the vertical axis which represent the height of bars.

In a histogram, the bars are attached to each other.

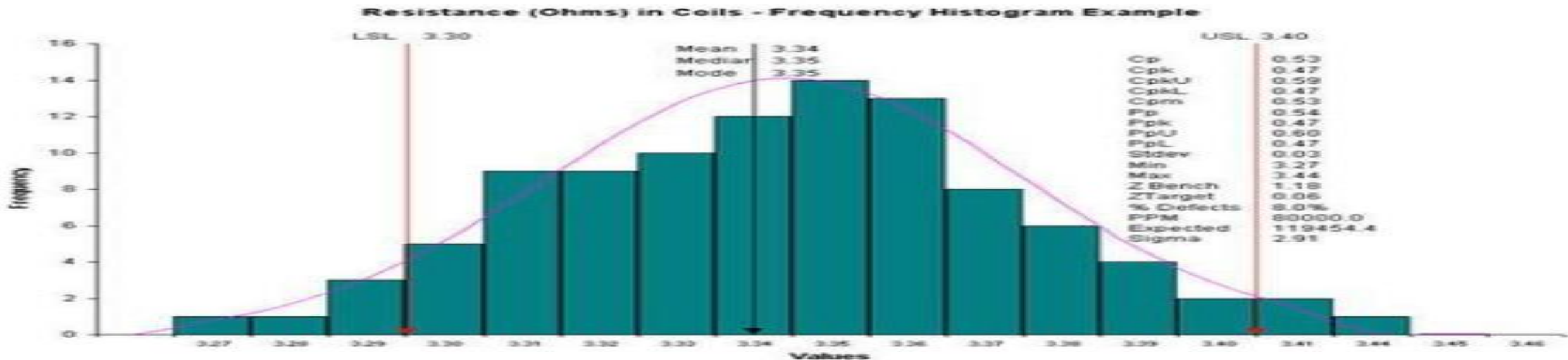
Histograms



Histograms

What are the shapes of histograms ??

A-) Symmetric histogram / is identical on both sides of its central points.

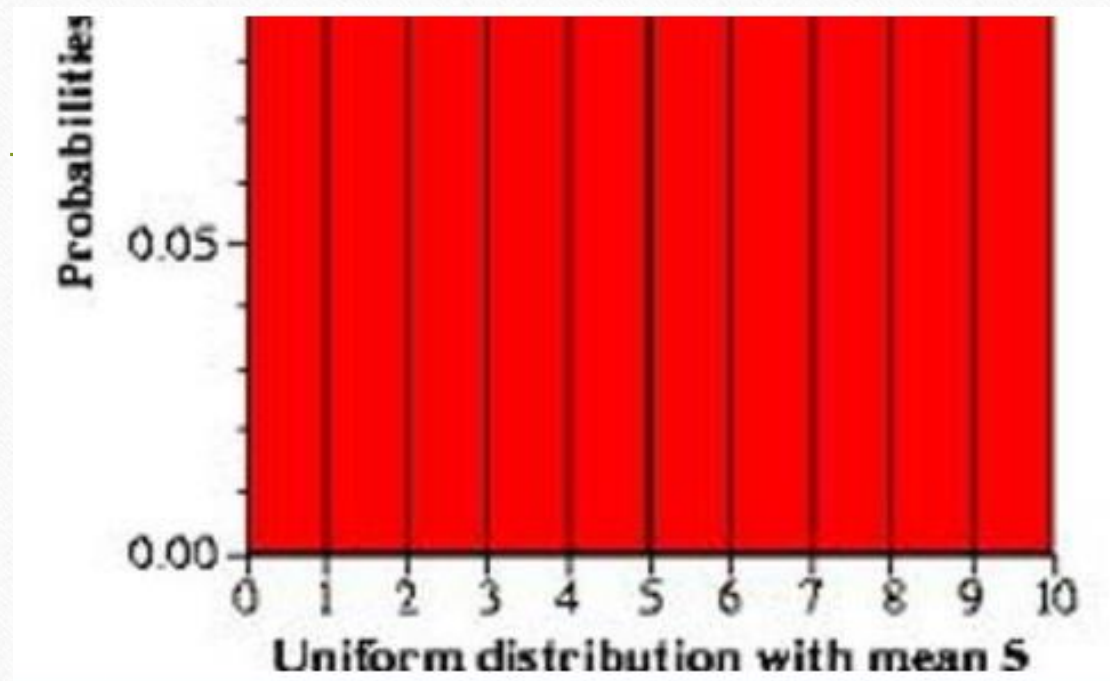


Histograms



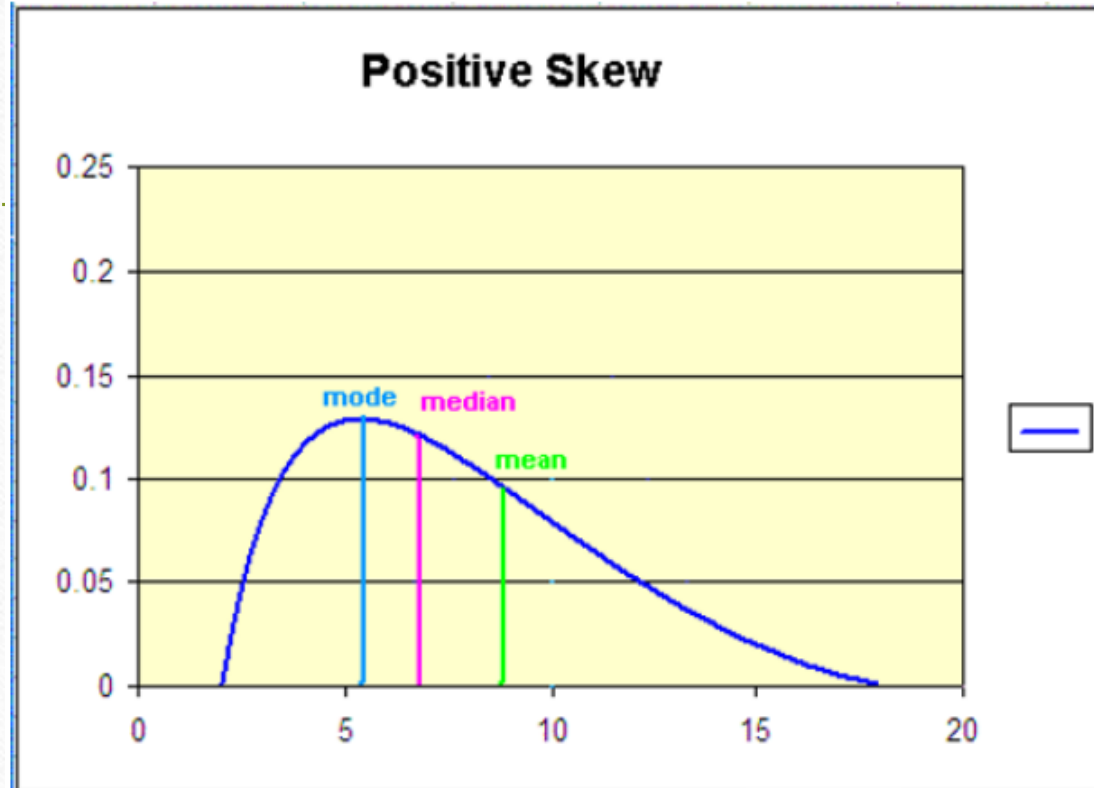
B-) Bimodal symmetric histogram / is identical on both sides of its central points with two modes

Histograms



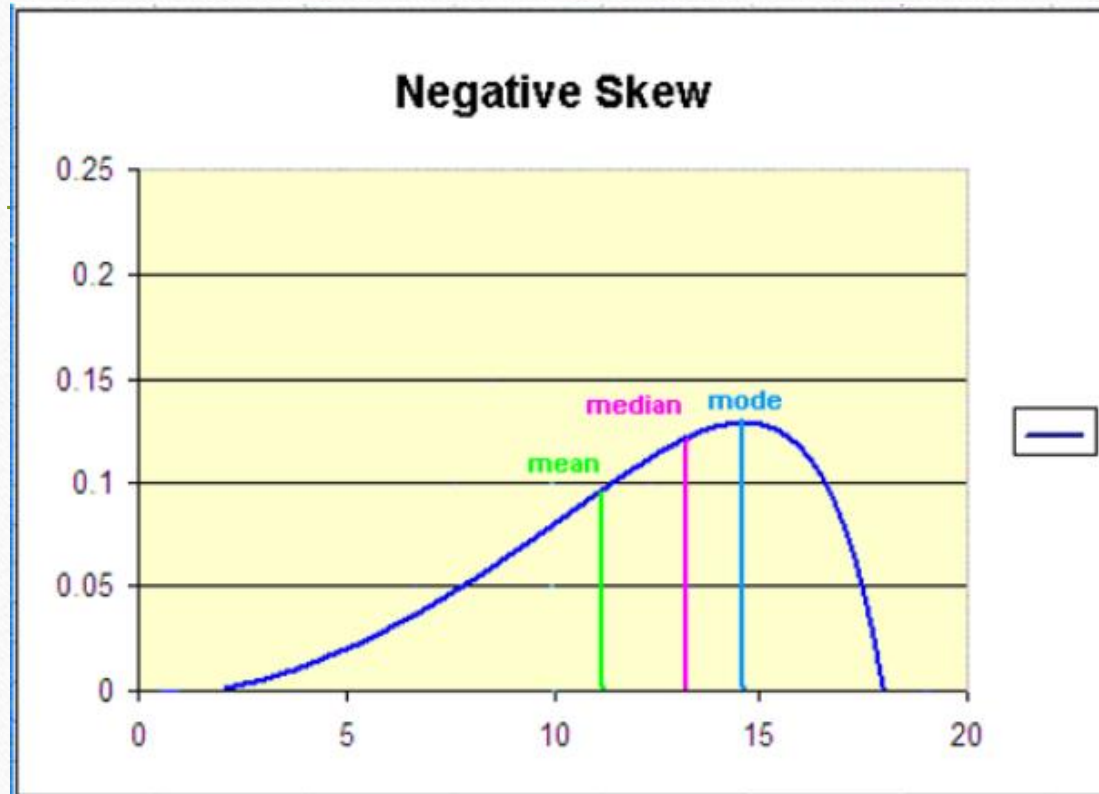
C-) Uniform or rectangular histogram (symmetric) / the frequencies of each class are the same or equal to each other.

Histograms



D-) Skewed to the right histogram (positive skewed) /
Most of data is shown in the left side of histogram and the tail on the other right side.

Histograms



E-) Skewed to the left histogram (negative skewed) / Most of data is shown in the right side of histogram and the tail on the other left side.

Polygons

2- Polygons / A graph formed by joining the midpoints of the tops of bars in a histogram with straight lines.

Polygons



Stem and Leaf display

3- Stem and Leaf display / each value is divided into two portions -- a stem and a leaf. Then the leaves for each stem are shown separately in a display.

Stem and Leaf display

Construct a stem-and-leaf display for these data

**Example / 22 , 26 , 27 , 31 , 33 , 35 , 42 , 44 , 46 , 57 , 58 , 59
, 61 , 63, 64 , 65 ,67**

Solution

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

Organizing and Displaying Data

Qualitative Data

- **Raw Data:**

Data recorded in the sequence in which they are collected and before they are processed or ranked are called *raw data*.

Example of Raw Data

Scores of 50 students

21	19	24	25	29	34	26	27	37	33
18	20	19	22	19	19	25	22	25	23
25	19	31	19	23	18	23	19	23	26
22	28	21	20	22	22	21	20	19	21
25	23	18	37	27	23	21	25	21	24

ORGANIZING AND GRAPHING QUALITATIVE DATA

- Frequency Distributions
- Relative Frequency and Percentage Distributions
- Graphical Presentation of Qualitative Data
 - Bar Graphs
 - Pie Charts

Frequency Distributions

Definition

A *frequency distribution* for qualitative data lists all categories and the number of elements that belong to each of the categories.

Frequency Table

Variable → **Type of College** **Number of Students** ← **Frequency Column**

	Public Health	200	
Category →	Nursing	300	← Frequency
	Pharmacy	400	

Sum = 900

Example for Frequency Table

- A sample of 30 employees from Al-Baha city was selected, and these employees were asked for their monthly salary. The responses of these employees are recorded next where *high income*, *middle income*, and *low income*.

Construct a frequency distribution table for these data ?

High	Low	High	Low	Low	Middle
Low	Middle	High	Middle	Middle	High
Middle	High	Middle	Middle	Middle	Middle
High	Low	High	Middle	Low	Middle
High	Low	Low	High	Middle	High

Solution for Frequency Table

Income	Tally	Frequency (f)
High		10
Middle		12
Low		8
		Sum = 30

Relative Frequency and Percentage Distributions

Calculating Relative Frequency of a Category

$$\text{Relative frequency of a category} = \frac{\text{Frequency of that category}}{\text{Sum of all frequencies}}$$

Relative Frequency and Percentage Distributions

Calculating Percentage

$$\text{Percentage} = (\text{Relative frequency}) * 100$$

Determine the Relative Frequency and Percentage for the Data in the Table

Income	Tally	Frequency (f)
High		10
Middle		12
Low		8
		Sum = 30

Solution

Income	Relative Frequency	Percentage
High	$10/30 = 0.333$	$0.333(100) = 33.3$
Middle	$12/30 = 0.40$	$0.40(100) = 40.0$
Low	$8/30 = 0.267$	$0.267(100) = 26.7$
	Sum = 1.00	Sum = 100

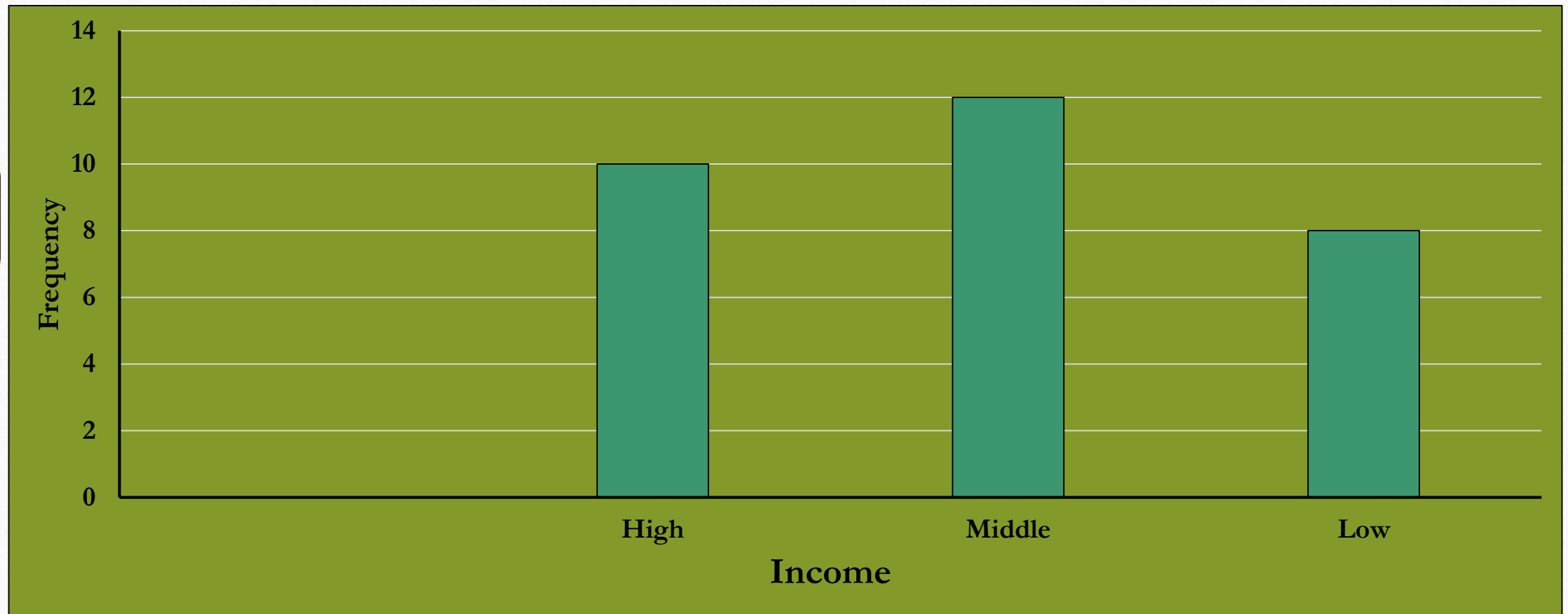
Graphical Presentation of Qualitative Data

Bar Graph – Bar Chart

Definition

A graph made of bars whose heights represent the frequencies of respective categories is called a *bar graph*.

Bar Graph – Bar Chart



Graphical Presentation of Qualitative Data

Pie Graph - Pie Chart

Definition

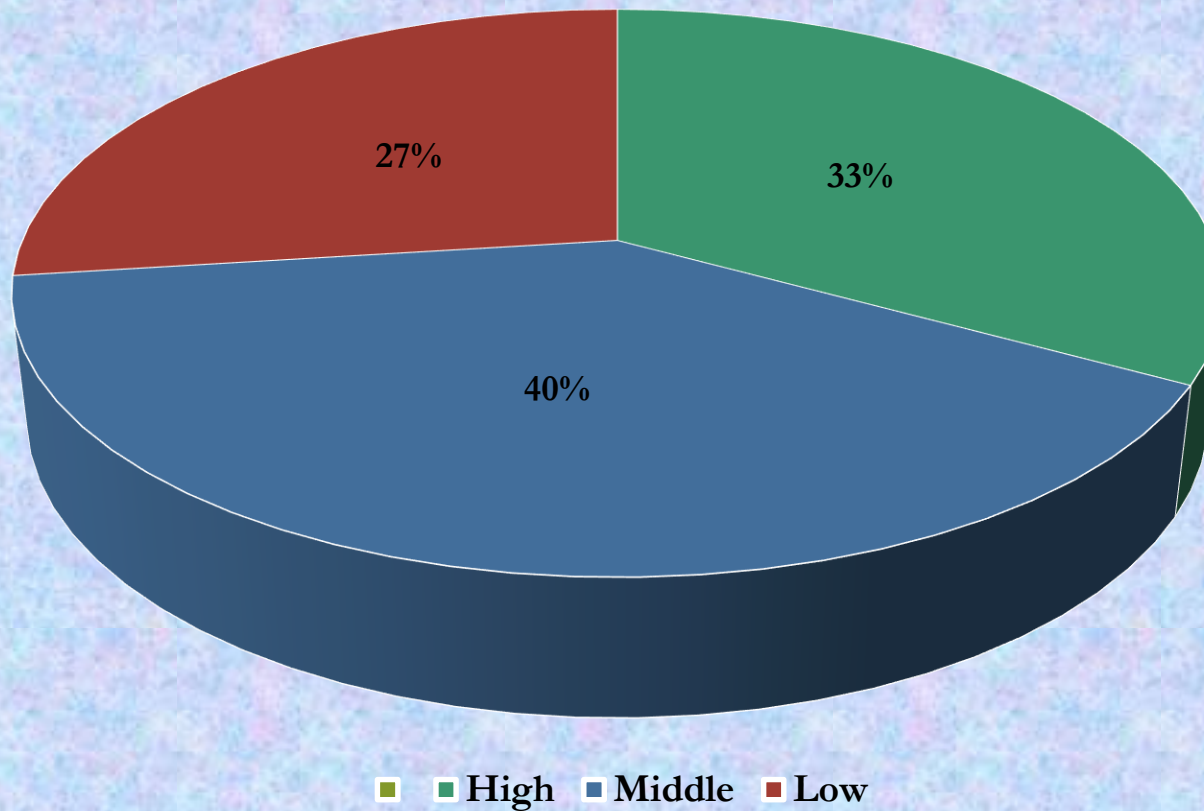
A circle divided into portions that represent the relative frequencies or percentages of a population or a sample belonging to different categories is called a *pie chart*.

Calculating Angle Sizes for the Pie Chart

Pie Graph - Pie Chart

Income	Relative Frequency	Angle Size
High	$10/30 = 0.333$	$360 (0.333) = 119.9$
Middle	$12/30 = 0.40$	$360 (0.40) = 144.0$
Low	$8/30 = 0.267$	$360 (0.267) = 96.1$
Sum = 1.00		Sum = 360

Pie Graph - Pie Chart



Reference

- Prem S. Mann 1998, Introductory Statistics, 7th edn, New York, USA.

Good Luck for All Students

- Please do not hesitate to contact me if you have any questions.
- Dr. Ibrahim AL-Jaafari
- www.Alghamdi-Biostatistics.com
- **Email.** Bio-stat@Hotmail.com
- Mobile Number : 0553777925

سبحان الله وبحمده سبحان الله العظيم

ذكر الله أعظم ما في الوجود ،، لعل الله يرحمنا بعلم تعلمناه في الحياة
الدنيا

أستغفر الله