2 METHODS OF DATA PRESNTATION

- Having collected and edited the data, the next important step is to organize it.
- That is to present it in a readily comprehensible condensed form that aids in order to draw inferences from it.
- It is also necessary that the like be separated from the unlike ones.
- The presentation of data is broadly classified in to the following two categories:

- **Tabular presentation**
- **Diagrammatic and Graphic presentation.**

CON'T…

- The process of arranging data in to classes or categories according to similarities technically is called *classification*.
- Classification is a preliminary and it prepares the ground for proper presentation of data.

➢ **Definitions:**

- **Raw data**: recorded information in its original collected form, whether it is counts or measurements, is referred to as raw data.
- **Frequency**: is the number of values in a specific class of the distribution.
- **Frequency distribution**: is the organization of raw data in table form using classes and frequencies.

THREE BASIC TYPES OF FREQUENCY DISTRIBUTIONS

- Categorical frequency distribution
- Ungrouped frequency distribution
- Grouped frequency distribution

- There are specific procedures for how to constructing each type.

Categorical frequency Distribution

- Used for data that can be place in specific categories such as nominal, or ordinal. e.g. marital status, blood type,….
- Example: a health worker collected the following data on blood type for 25 persons.(A, B, O, AB)

A	B	AB	O	AB
B	B	A	A	A
O	AB	B	A	A
O	AB	AB	B	B
B	O	O	AB	AB

CON'T

Solution:

- Since the data are categorical, discrete classes can be used.

  There are four types of blood type A, B, O, and AB.

- These types will be used as class for the distribution.

- We follow procedure to construct the frequency distribution.

- Step 1: Make a table as shown.

Class (1)	Tally (2)	Frequency (3)	Percent (4)
A			
B			
AB			
O			

CON'T

- Step 2: Tally the data and place the result in column (2).
- **Step 3:** Count the tally and place the result in column (3).
- Step 4: Find the percentages of values in each class by using;

$\% = \frac{f}{n} 100$ Where f = frequency of the class, n= total number of value or observations.

- Step 5: Find the total for column (3) and (4).
- Combing the entire steps one can construct the following frequency distribution.

Con't…

Class (1)	Tally (2)	Frequency (3)	Percent (4)
A	𝍸 /	6	24
B	𝍸 //	7	28
AB	𝍸 //	7	28
O	𝍸	5	24

Ungrouped frequency Distribution

- It is a table of all the potential raw score values that could possible occur in the data along with the number of times each actually occurred.
- It is often constructed for small set or data on discrete variable.

Steps in constructing ungrouped frequency distribution:

- First find the smallest and largest raw score in the collected data.
- Arrange the data in order of magnitude and count the frequency.
- To facilitate counting one may include a column of tallies.

EXAMPLE:

THE FOLLOWING DATA REPRESENT THE MARK OF 20 STUDENTS.

80	76	90	85	80
70	60	62	70	85
65	60	63	74	75
76	70	70	80	85

Construct a frequency distribution, which is ungrouped.

Solution:

Step 1: Find the range, Range=Max-Min=90-60=30.

Step 2: Make a table as shown

Step 3: Tally the data.

Step 4: Compute the frequency.

CON'T

Mark	Tally	Frequency
60	//	2
62	/	1
63	/	1
65	/	1
70	////	4
74	/	1
75	/	1
76	//	2
80	///	3
85	///	3
90	/	1

- Each individual value is presented separately, that is why it is named ungrouped frequency distribution.

Grouped frequency Distribution

- When the range of the data is large, the data must be grouped in to classes that are more than one unit in width.

Definitions:

- **Grouped Frequency Distribution:** a frequency distribution when several numbers are grouped in one class.
- **Class limits:** Separates one class in a grouped frequency distribution from another.
- The limits could actually appear in the data and have gaps between the upper limits of one class and lower limit of the next.
- **Units of measurement (U):** the distance between two possible consecutive measures. It is usually taken as 1, 0.1, 0.01, 0.001,

CON'T

- **Class boundaries:** Separates one class in a grouped frequency distribution from another.
- The boundaries have one more decimal places than the row data and therefore do not appear in the data. There is no gap between the upper boundary of one class and lower boundary of the next class
- **Class width:** the difference between the upper and lower class boundaries of any class.
- It is also the difference between the lower limits of any two consecutive classes or the difference between any two consecutive class marks.
- **Class mark (Mid points):** it is the average of the lower and upper class limits or the average of upper and lower class boundary.

CON'T

- **Cumulative frequency:** is the number of observations less than/more than or equal to a specific value.
- **Cumulative frequency above:** it is the total frequency of all values greater than or equal to the lower class boundary of a given class.
- **Cumulative frequency blow:** it is the total frequency of all values less than or equal to the upper class boundary of a given class.
- **Cumulative Frequency Distribution (CFD):** it is the tabular arrangement of class interval together with their corresponding cumulative frequencies.

Steps for constructing Grouped frequency Distribution

1. Find the largest and smallest values

2. Compute the Range(R) = Maximum - Minimum

3. Select the number of classes desired, usually between 5 and 20 or use Sturges rule $K=1+3.32\log n$ where *k is number of classes desired and n is total number of observation.*

4. Find the class width by dividing the range by the number of classes and rounding up, not off. $W = \frac{R}{K}$

5. Pick a suitable starting point less than or equal to the minimum value.

The starting point is called the lower limit of the first class.

CON'T

- To find the upper limit of the first class, subtract U from the lower limit of the second class.
- Then continue to add the class width to this upper limit to find the rest of the upper limits.
- Find the boundaries by subtracting U/2 units from the lower limits and adding U/2 units from the upper limits.
- The boundaries are also half-way between the upper limit of one class and the lower limit of the next class.
- Tally the data.
- Find the frequencies.

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- Find the cumulative frequencies.
- Depending on what you're trying to accomplish, it may not be necessary to find the cumulative frequencies.
- If necessary, find the relative frequencies and/or relative cumulative frequencies

CON'T

Example:

Construct a frequency distribution for the following data.

11	29	6	33	14	31	22	27	19	20
18	17	22	38	23	21	26	34	39	27

Solutions:

Step 1: Find the highest and the lowest value H=39, L=6

Step 2: Find the range; R=H-L=39-6=33

Step 3: Select the number of class's desired using Sturges formula;

k =1+3.32log (20) =5.32=6(rounding up)

Step 4: Find the class width; w=R/*k*=33/6=5.5=6 (rounding up)

CON'T

Step 5: Select the starting point, let it be the minimum observation.

- 6, 12, 18, 24, 30, 36 are the lower class limits.

Step 6: Find the upper class limit; e.g. the first upper class=12-

U=12-1=11

11, 17, 23, 29, 35, 41 are the upper class limits.

So combining step 5 and step 6, one can construct the following classes.

Class limits
6 – 11
12 – 17
18 – 23
24 – 29
30 – 35
36 – 41

CON'T

- Step 7: Find the class boundaries;
- E.g. for class 1 Lower class boundary=6-U/2=5.5

  Upper class boundary =11+U/2=11.5
- Then continue adding w on both boundaries to obtain the rest boundaries.
- By doing so one can obtain the following classes.

Class boundary
5.5 – 11.5
11.5 – 17.5
17.5 – 23.5
23.5 – 29.5
29.5 – 35.5
35.5 – 41.5

Con't

Step 8: tally the data.

Step 9: Write the numeric values for the tallies in the frequency column.

Step 10: Find cumulative frequency.

Step 11: Find relative frequency or/and relative cumulative frequency.

- The complete frequency distribution follows:

Class limit	Class boundary	Class Mark	Tally	Freq.	Cf (less than type)	Cf (more than type)	rf.	rcf (less than type
6 – 11	**5.5 – 11.5**	**8.5**	//	**2**	**2**	**20**	**0.10**	**0.10**
12 – 17	**11.5 – 17.5**	**14.5**	//	**2**	**4**	**18**	**0.10**	**0.20**
18 – 23	**17.5 – 23.5**	**20.5**	/// //	**7**	**11**	**16**	**0.35**	**0.55**
24 – 29	**23.5 – 29.5**	**26.5**	////	**4**	**15**	**9**	**0.20**	**0.75**
30 – 35	**29.5 – 35.5**	**32.5**	///	**3**	**18**	**5**	**0.15**	**0.90**
36 – 41	**35.5 – 41.5**	**38.5**	//	**2**	**20**	**2**	**0.10**	**1.00**

DIAGRAMMATIC AND GRAPHIC PRESENTATION OF DATA.

- These are techniques for presenting data in visual displays using geometric and pictures.
- **Importance:**
  - They have greater attraction.
  - They facilitate comparison.
  - They are easily understandable.

CON'T…

- Diagrams are appropriate for presenting discrete data.
- The three most commonly used diagrammatic presentation for discrete as well as qualitative data are:
  - Pie charts
  - Bar charts

CON'T

- **Pie chart**
- A pie chart is a circle that is divided in to sections or wedges according to the percentage of frequencies in each category of the distribution.
- The angle of the sector is obtained using:
- $Percentage = \frac{f}{n} \times 100$
- $ngle\ of\ Sector = \frac{f}{n} \times 360$
- Example: Draw a pie chart to represent the following data on accidents categorized according to the area injured.

Con't

fingers	eyes	arm	leg
17	5	2	1

Solutions:

Step 1: Find the percentage.

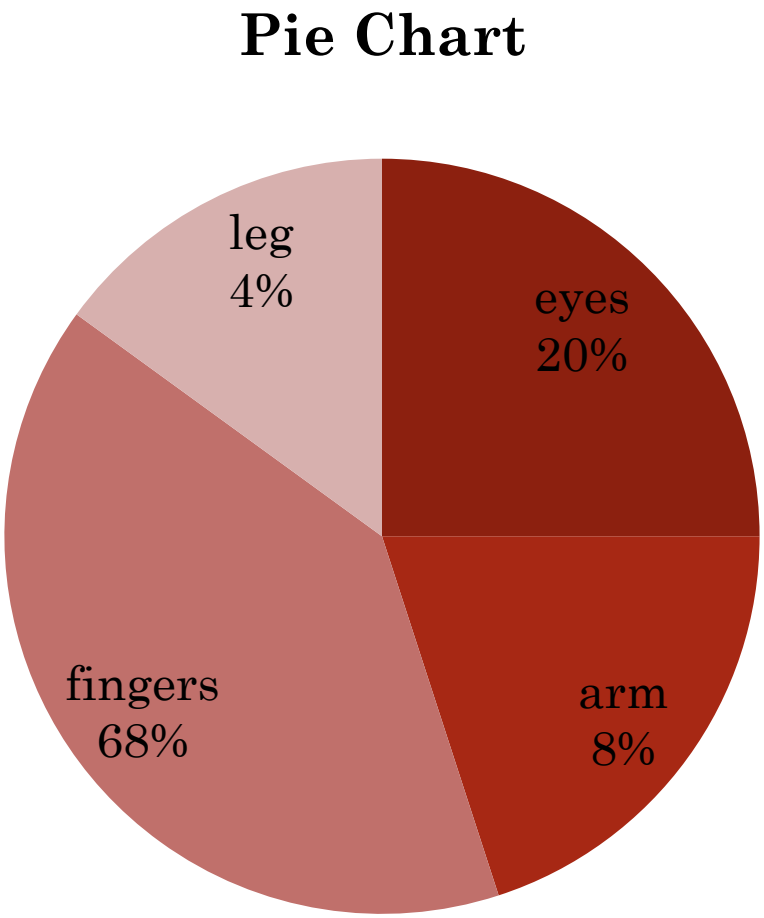
Step 2: Find the number of degrees for each class.

Step 3: Using a protractor and compass, graph each section and write its name corresponding percentage.

Con't

Class	Frequency	Percent	Degree
fingers	17	68	244.8
eyes	5	20	72
arm	2	8	28.8
leg	1	4	14.4
Total	25	100	360

Con't



BAR GRAPH

- Bars can be drawn either vertically or horizontally.
- There are different types of bar charts.
- The most common being are:
  - Simple bar chart
  - Component or sub divided bar chart.
  - Multiple bar charts.

Simple Bar Chart

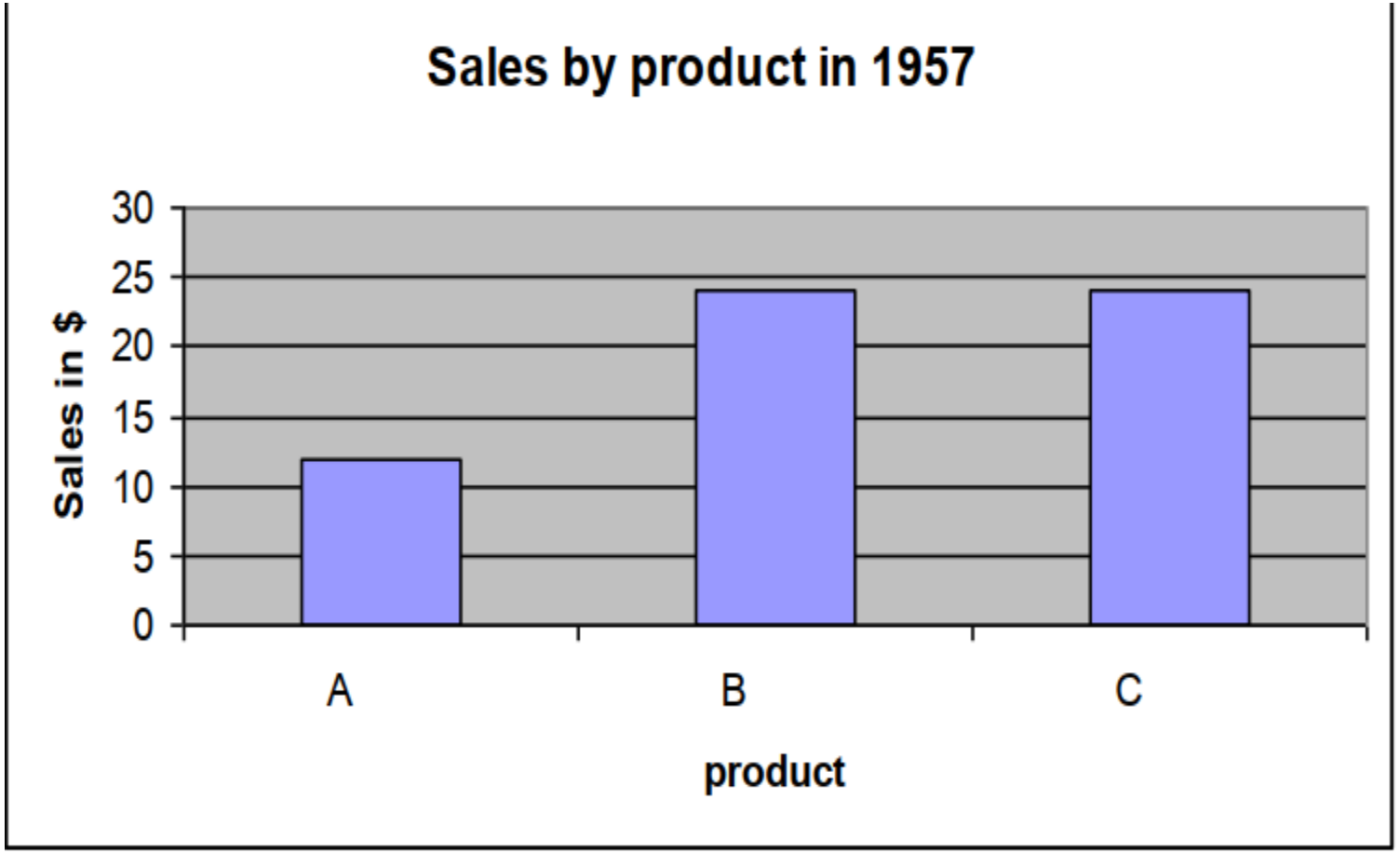
- Are used to display data on one categorical variable.
- They are thick lines (narrow rectangles) having the same range.
- The magnitude of a quantity is represented by the height /length of the bar.

Example: The following data represent sale by product, 1957- 1959 of a given company for three products A, B, C.

Product	Sales($) In 1957	Sales($) In 1958	Sales($) In 1959
A	12	14	18
B	24	21	18
C	24	35	54

CON'T

- Solutions:



Component Bar chart

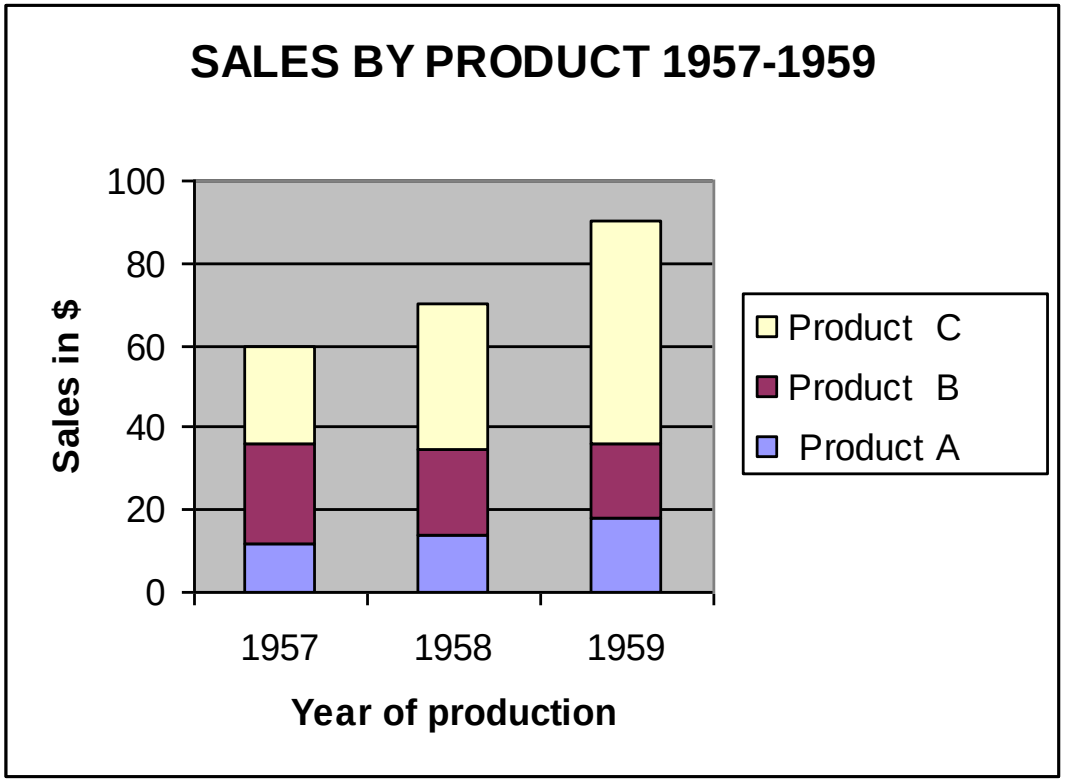
- Desire to show how a total (or aggregate) is divided in to its component parts
- The bars represent total value of a variable with each total broken in to its component parts
- Different colors or designs are used for identifications

Example:

Draw a component bar chart to represent the sales by product from 1957 to 1959.

Solutions:

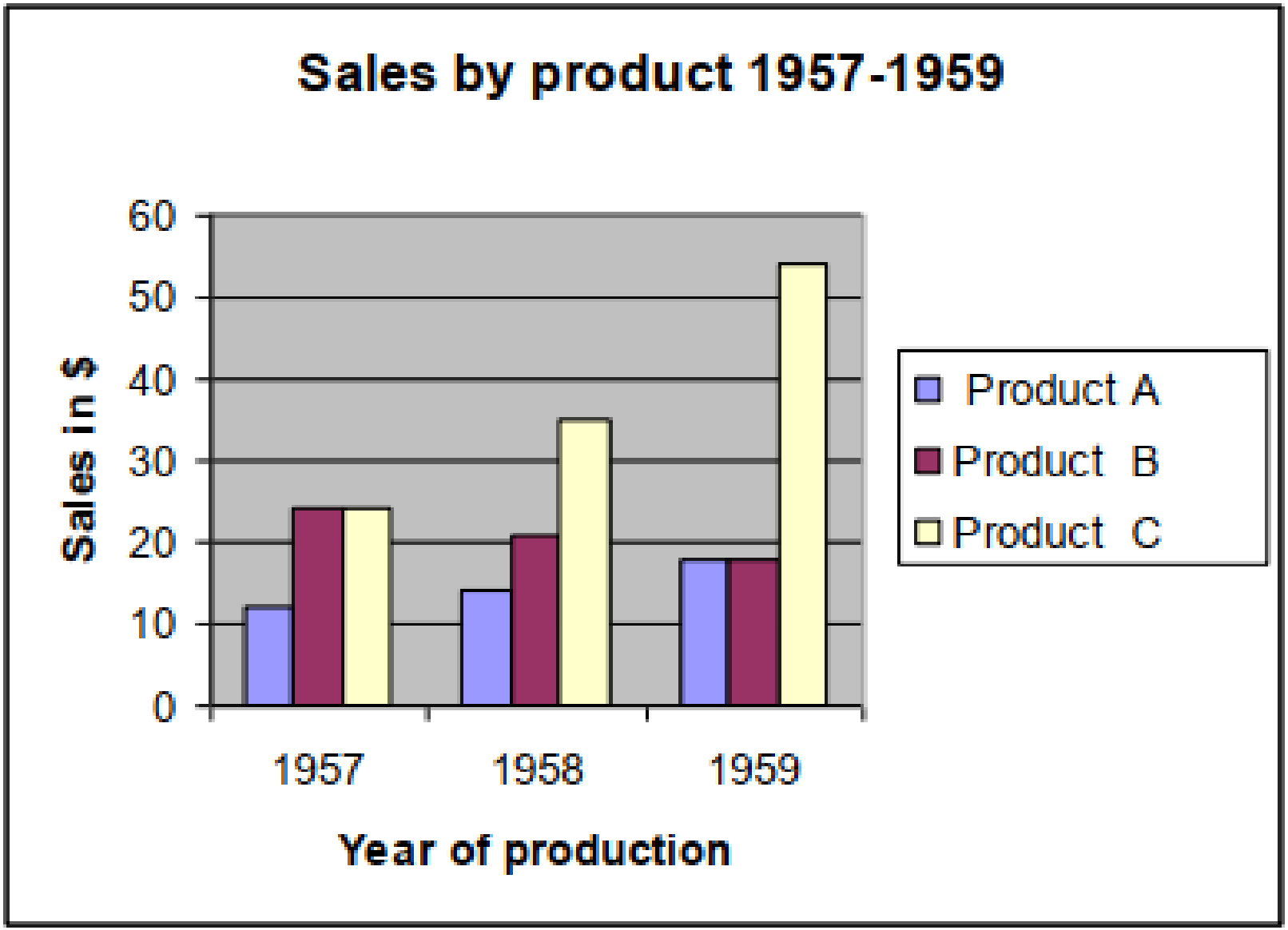
CONT…



Multiple Bar charts

These are used to display data on more than one variable. They are used for comparing different variables at the same time.

CON'T


Sales by product 1957-1959
Sales in $
60
50
40
30
20
10
0
1957
1958
1959
Year of production
Product A
Product B
Product C

Graphical Presentation of data

- The histogram, frequency polygon and cumulative frequency graph or ogive are most commonly applied graphical representations for continuous data.

✓ **Procedures for constructing statistical graphs:**

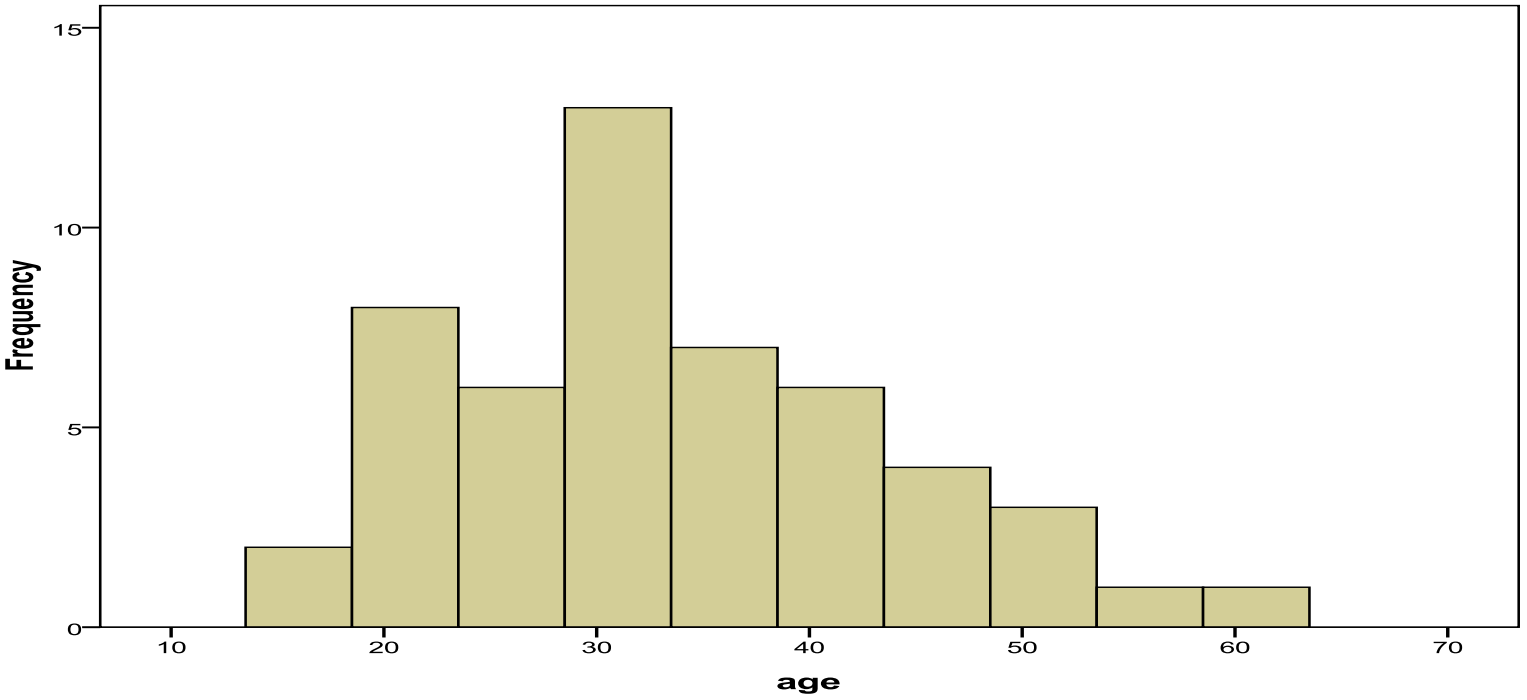
- Draw and label the X and Y axes.
- Choose a suitable scale for the frequencies or cumulative frequencies and label it on the Y axes.
- Represent the class boundaries for the histogram or ogive or the mid points for the frequency polygon on the X axes.
- Plot the points and draw the bars or lines to connect the points.

Histogram

- A graph which displays the data by using vertical bars of various height to represent frequencies.
- Class boundaries are placed along the horizontal axes.

  Example: Construct a histogram to represent the previous data (example *)

Class limit	Class boundaries	Mid point	Frequency
15-19	14.5-19.5	17	2
20-24	19.5-24.5	22	8
25-29	24.5-29.5	27	6
30-34	29.5-34.5	32	12
35-39	34.5-39.5	37	7
40-44	39.5-44.5	42	6
45-49	44.5-49.5	47	4
50-54	49.5-54.5	52	3
55-59	54.5-59.5	57	1
60-64	59.5-64.5	62	1



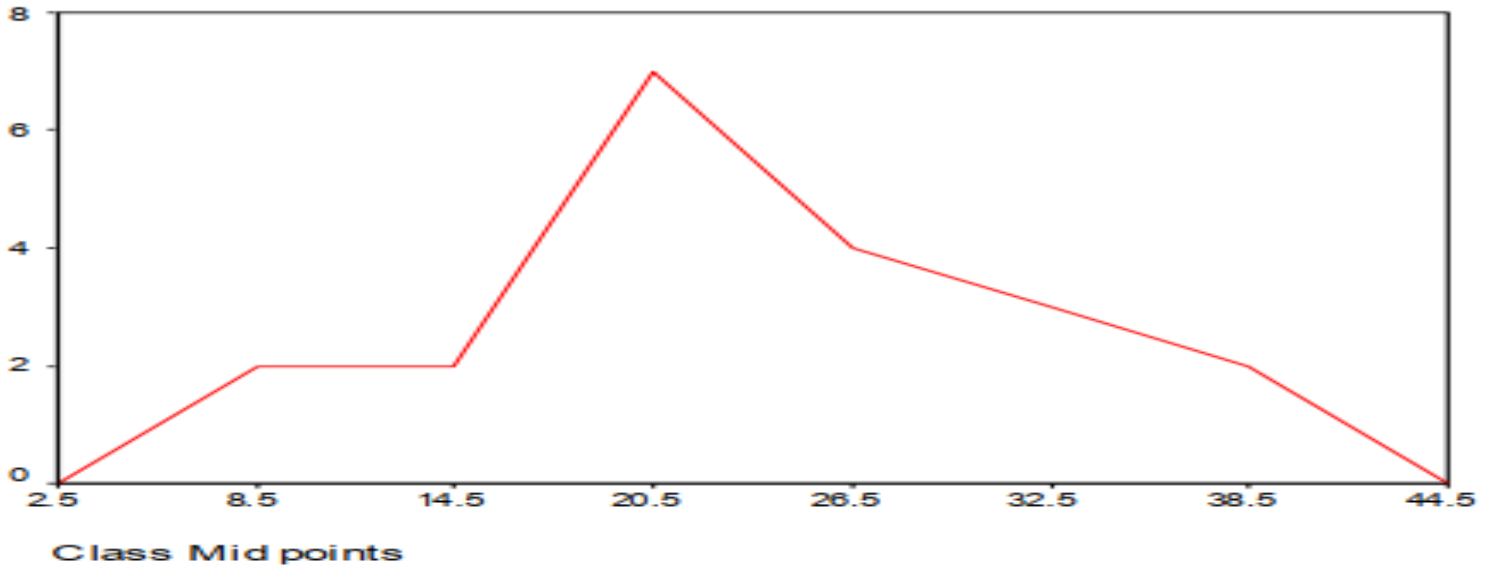
Frequency Polygon:

- A line graph.
- The frequency is placed along the vertical axis and classes mid points are placed along the horizontal axis.
- It is customer to the next higher and lower class interval with corresponding frequency of zero, this is to make it a complete polygon

  Example: Draw a frequency polygon for the above data (example *).

  Solutions:

Class limit	Mid point	Frequency
15-19	17	2
20-24	22	8
25-29	27	6
30-34	32	12
35-39	37	7
40-44	42	6
45-49	47	4
50-54	52	3
55-59	57	1



CON'T…

- Ogive (cumulative frequency polygon)

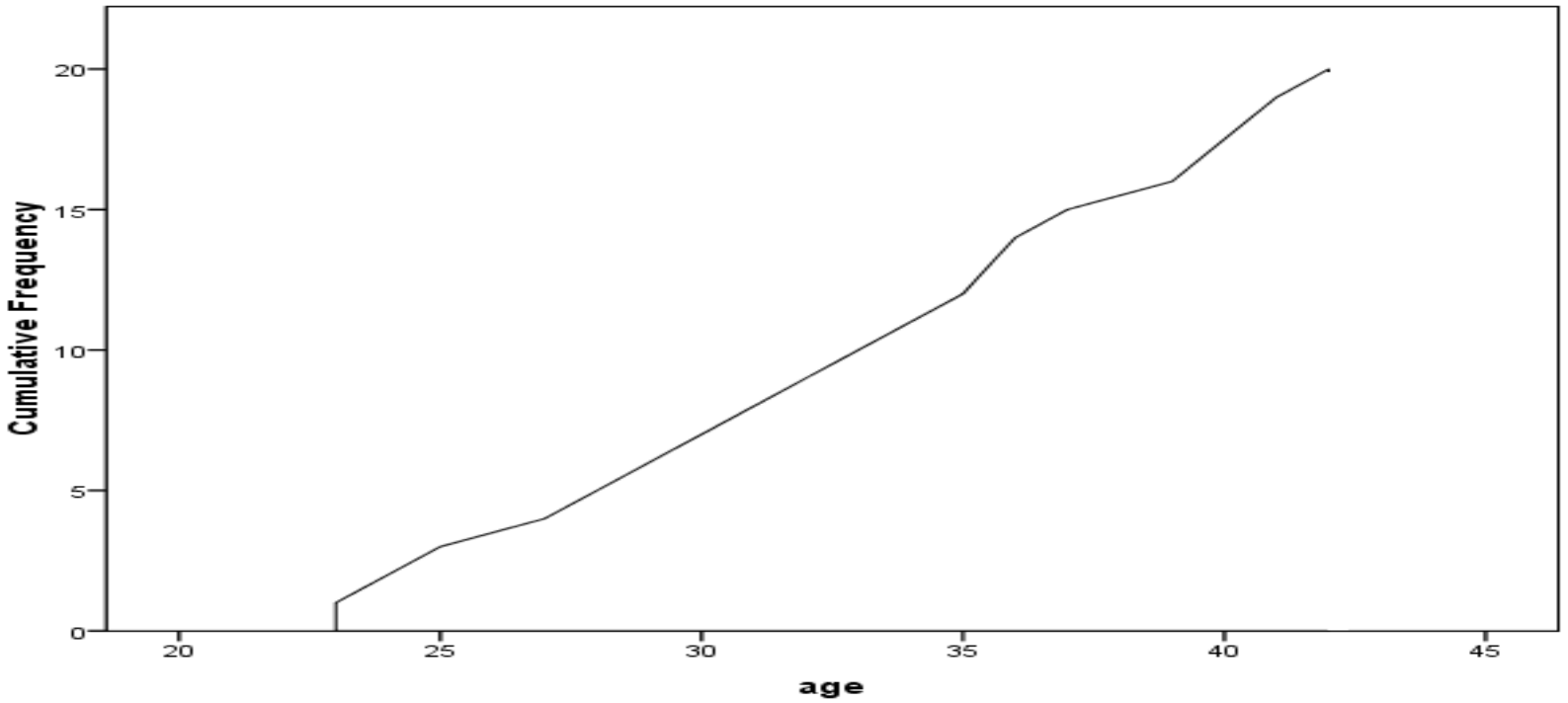
  - A graph showing the cumulative frequency (less than or more than type) plotted against upper or lower class boundaries respectively.

- That is class boundaries are plotted along the horizontal axis and the corresponding cumulative frequencies are plotted along the vertical axis.

- The points are joined by a free hand curve.

  Example: Draw an ogive curve(less than type) for the above data.(Example *)

Class limit	Frequency	LCF	More than
23-26	3	≤ 26.5 (≤ 26) = 3	≥ 22.5 (≥ 23) = 20
27-30	4	≤ 30.5 (≤ 30) = 7	≥ 26.5 (≥ 27) = 17
31-34	3	≤ 34.5 (≤ 34) = 10	≥ 30.5 (≥ 31) = 13
35-38	5	≤ 38.5 (≤ 38) = 15	≥ 34.5 (≥ 35) = 10
39-42	5	≤ 42.5 (≤ 42) = 20	≥ 38.5 (≥ 39) = 5



Thank you!!!

Have you

Question