Chapter (2)
Describing Data
Frequency Distributions and Graphic Presentation
Examples

Frequency Table for Qualitative Data (nominal)

Example (1):

We select SRS consists of 52 books that display the color of the cover of each of those books

Orange, Blue, Orange, yellow, Red, Green , Orange, Blue, yellow, Red, Green, Red, Orange, yellow, Blue, Red, Orange, Blue , yellow, Red, Red, Green, Orange, Blue, Red, Green, Blue, Green, Blue, Red ,Orange ,Red, Blue, Green, Orange, Red, Orange, Blue, Orange, yellow, Blue, Green, Red , Red, Blue , Green, Red, Blue , Red , Red , Blue , Red

Construct the frequency & Relative table

Solution:

Colors	Tally mark	Frequency
Orange	ℍℍ ℍℍ	10
Blue	ℍℍ ℍℍ III	13
Red	ℍℍ ℍℍ ℍℍ I	16
Green	ℍℍ III	8
yellow	ℍℍ	5
Total		52

| Class (Colors)	Frequency	Relative Freq.	percent%
Orange	10	0.19	19
Blue	13	0.25	25
Red	16	0.31	31
Green	8	0.15	15
yellow	5	0.1	10
Total	52	1	100

Bar and Pie Charts

Example (2): Recall the frequency distribution that we had previously constructed in example (1) and Construct **a bar & pie chart** to represent this Table.

Class (Colors)	Orange	Blue	Red	Green	yellow	Total
Frequency	10	13	16	8	5	52
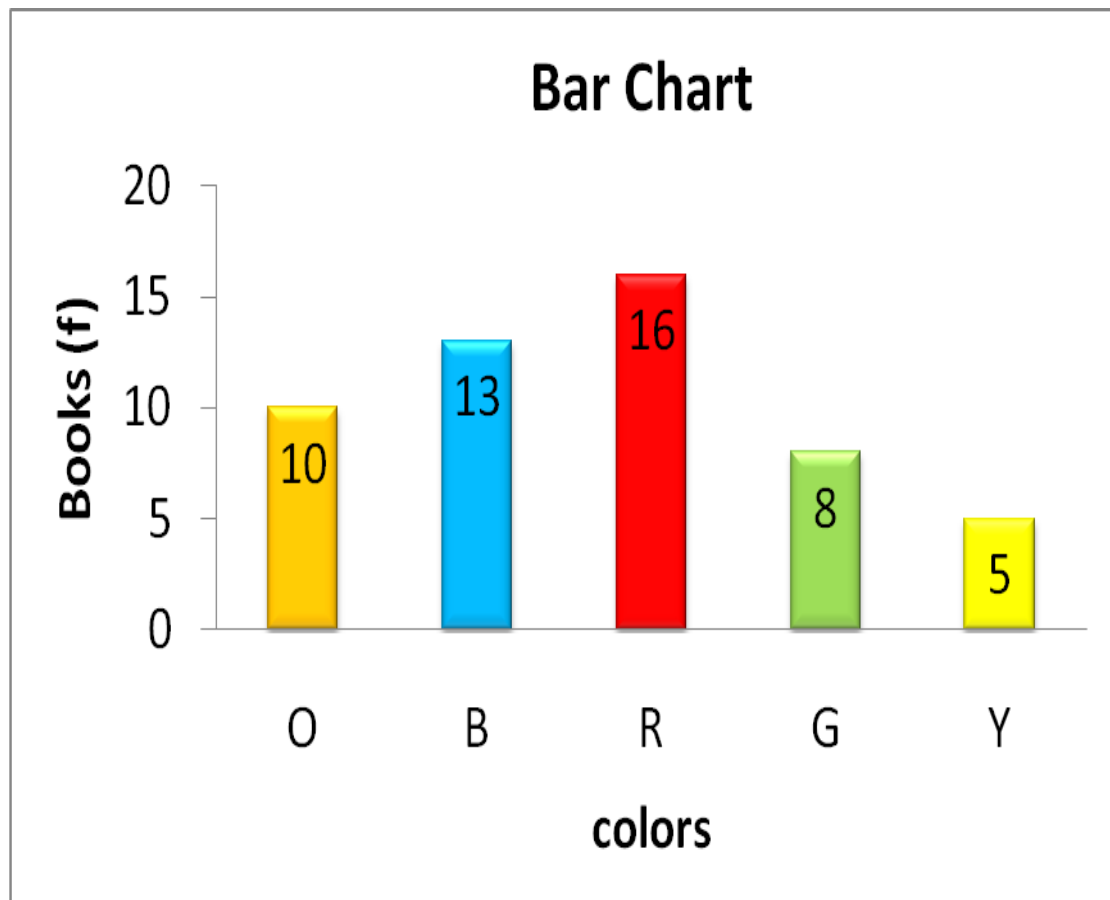
Pie chart:

Colors	Frequency	relative frequency
O	10	0.19
B	13	0.25
R	16	0.31
G	8	0.15
Y	5	0.1
Total	**52**	**1**

Pie Chart

Y
5
10%

O
10
19%

G
8
15%

B
13
25%

R
16
31%
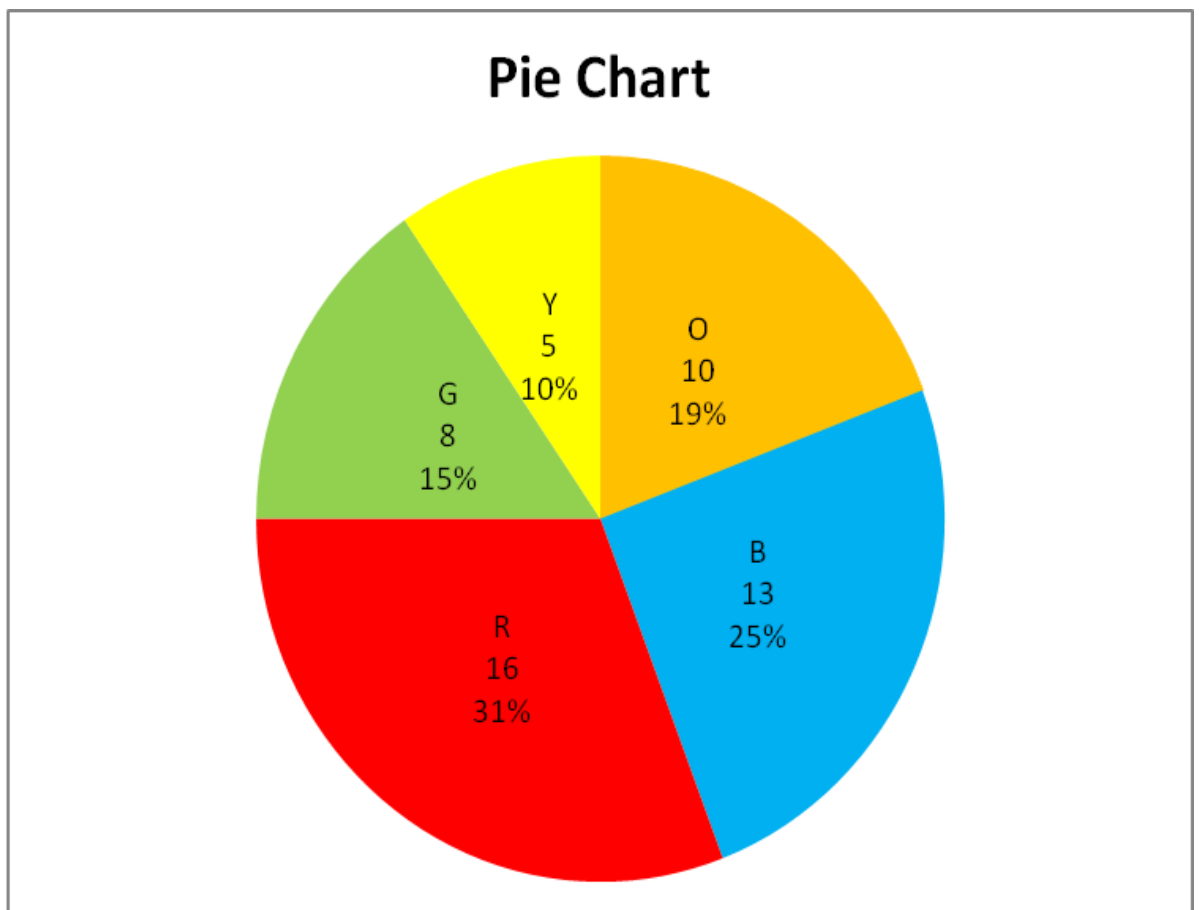
Frequency Table for Qualitative Data (ordinal)

Example (3):

The following data are grades of (25) students in the final exam:

F , B ,D , C , A , D , D , F , C , C , A , C , D , C , F , B , B,D, A , C ,D , B , C , D , C

Construct the:

- Frequency & Relative table.
- Ascending frequency table

Class	Tally	Frequency	Relative Frequency	percent%
F	///	3	0.12	12
D	///// //	7	0.28	28
C	///// ///	8	0.32	32
B	////	4	0.16	16
A	///	3	0.12	12
Total		25	1	100

Ascending frequency table

class	ACF
< F	0
< D	3
< C	10
< B	18
< A	22
≤ A	25

Frequency Table for Quantitative Data (Discrete)

Example (4):

The following data represent the number of children of(25) families :

0 , 1 , 2 , 2 , 4 , 1 , 2 , 3 , 5 , 3 , 3 , 1 , 0 , 3 , 1, 4 , 2 ,3 , 0 , 5, 3 , 2 , 0 , 2

- Construct the frequency table.
- Construct the relative , percent frequency &Ascending table

Frequency table

Class (Number of children)	Tally	Frequency
0	////	4
1	////	4
2	ЖЖ /	6
3	ЖЖ /	6
4	///	3
5	//	2
Total		25

Relative & percent frequency

Class (Number of children)	Frequency	relative Frequency	percent frequency
0	4	0.16	16 %
1	4	0.16	16 %
2	6	0.24	24 %
3	6	0.24	24 %
4	3	0.12	12 %
5	2	0.08	8 %
Total	25	1	100%

Ascending frequency table

class	ACF
< 0	0
< 1	4
< 2	8
< 3	14
< 4	20
< 5	23
≤ 5	25

Creating a Frequency Distribution Table

Example (5):

The following data are marks of (25) students in the final exam:

18, 20, 23, 32, 35, 36, 31, 33, 28, 37 , 40, 22, 25, 24, 29, 25, 34, 42, 41, 36 , 28, 40, 37, 19, 33

- Construct the frequency table.
- Construct the relative , percent frequency &Ascending table

(Quantitative and Continuous)

Solution:

- Step 1: Decide on the number of classes.

A useful recipe to determine the number of classes (k) is the "2 to the k rule." Such that $2^k > n$.

So $n = 25$. If we try $k = 4$, which means we would use 6 classes, then $2^4 = 16$, somewhat less than 25. Hence, 4 is not enough classes. If we let $k = 5$, then $2^5 = 32$, which is greater than 25.

So the recommended number of classes is 5.

- Step 2: Determine the class interval or width.

The formula is: $i \geq (H-L)/k$

   Where i is the class interval,

   H is the highest observed value,

   L is the lowest observed value,

   And k is the number of classes

$i \geq (42-18)/5$

$i \geq 4.8$ Use a class width of 5 degrees

- Step 3: first value =18

Class	Tally mark	Frequency
18 – 23	////	4
23 - 28	////	4
28 - 33	//// /	5
33 - 38	//// / ///	8
38 - 43	////	4
Total		25

Class	Frequency	Relative Freq.	percent%
18 – 23	4	0.16	16
23 - 28	4	0.16	16
28 - 33	5	0.20	20
33 - 38	8	0.32	32
38 - 43	4	0.16	16
Total	25	1	100%

Construct the Ascending Table

class' upper bound	ACF	Relative ACF
< 18	0	0
< 23	4	0.16
< 28	8	0.32
< 33	13	0.64
< 38	21	0.84
≤ 43	25	1

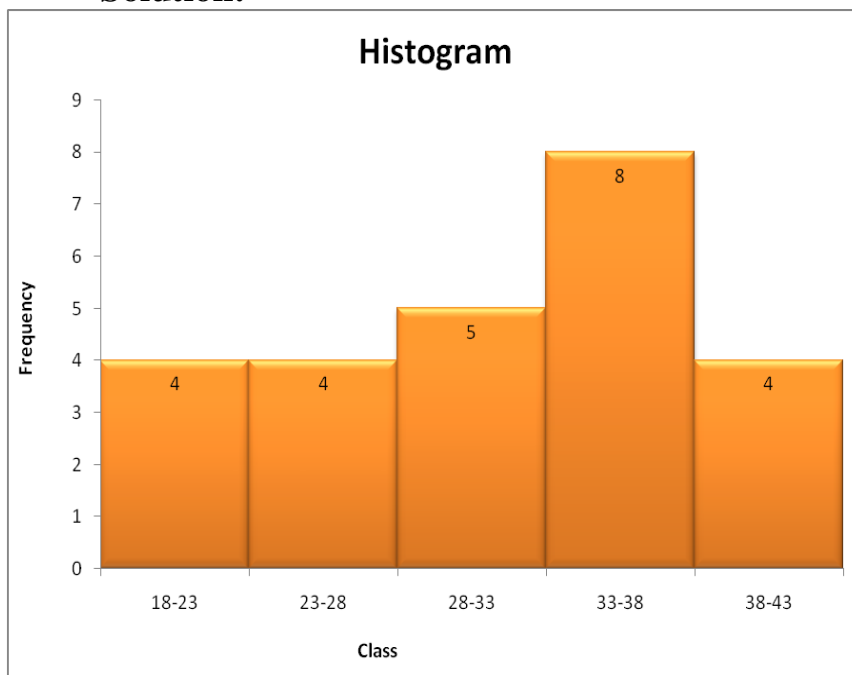**Example (6)**

Recall the frequency distribution that we had previously   constructed in example (5) :

Class	Frequency
18 - 23	4
23 - 28	4
28 -- 33	5
33 - 38	8
38 - 43	4
Total	25

1. Construct **a histogram** to represent this Table
2. Construct a **frequency polygon curve**.
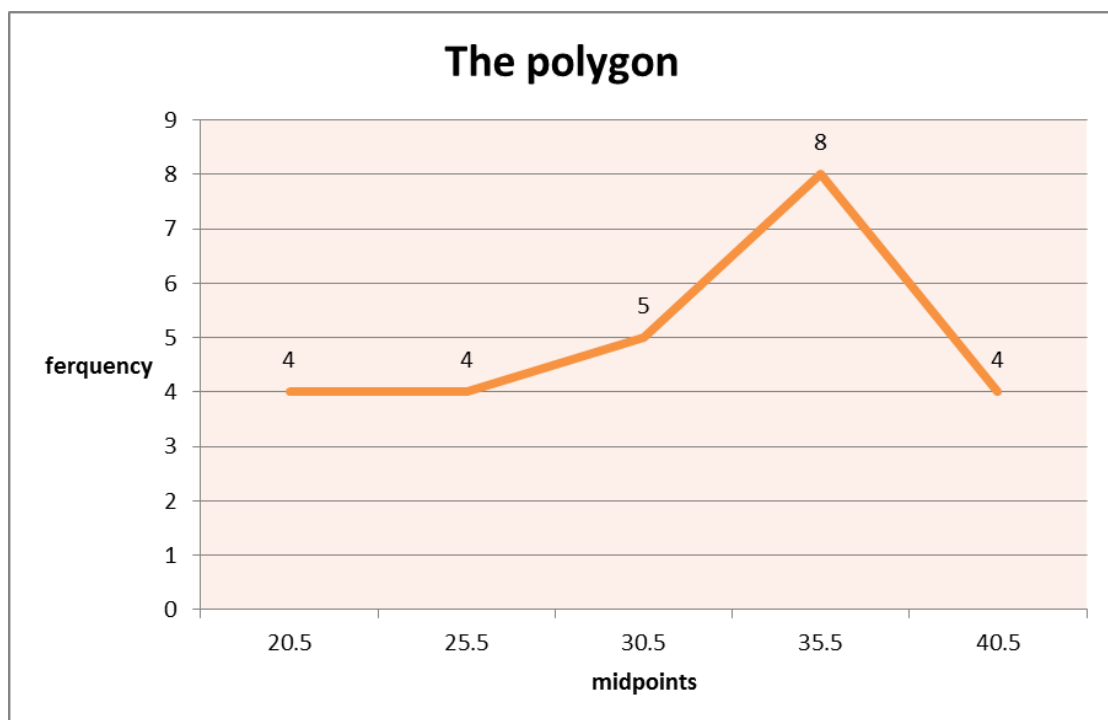3. Construct **ascending curve.**

Solution:

7

2- **The polygon**
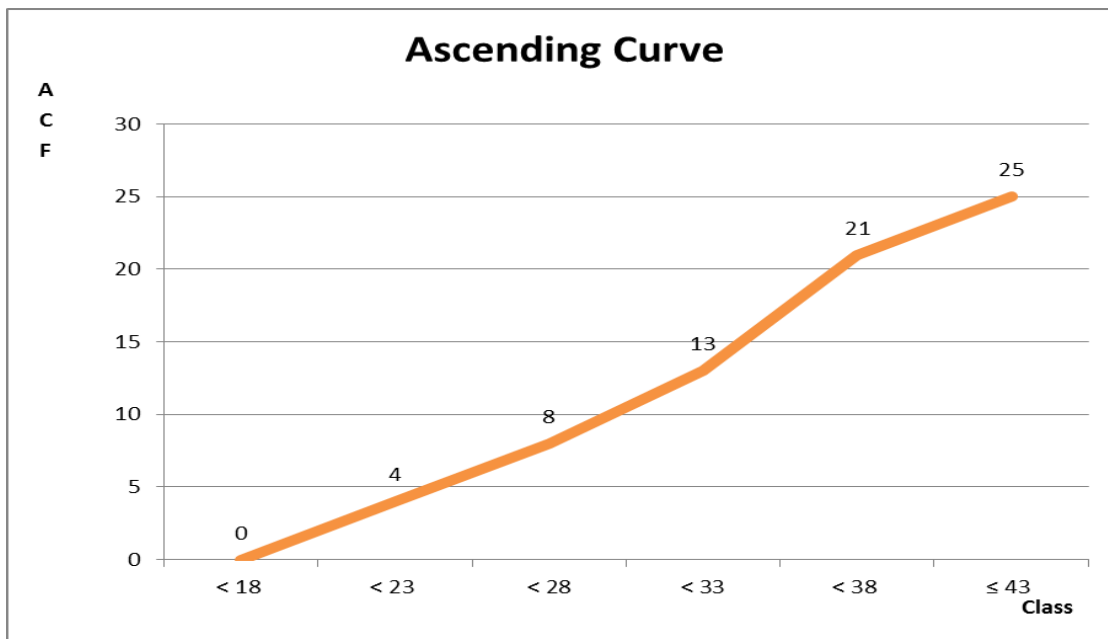
First compute the midpoint for each class:
 Midpoint = lower limit + Upper limit
              2

Class	Frequency	Midpoint
18 – 23	4	20.5
23 - 28	4	25.5
28 - 33	5	30.5
33 - 38	8	35.5
38 - 43	4	40.5
Total	25	

Ascending curve

class' upper bound	ACF
< 18	0
< 23	4
< 28	8
< 33	13
< 38	21
≤ 43	25

Example (7)

A histogram of the heights of 22 plants is as follows:
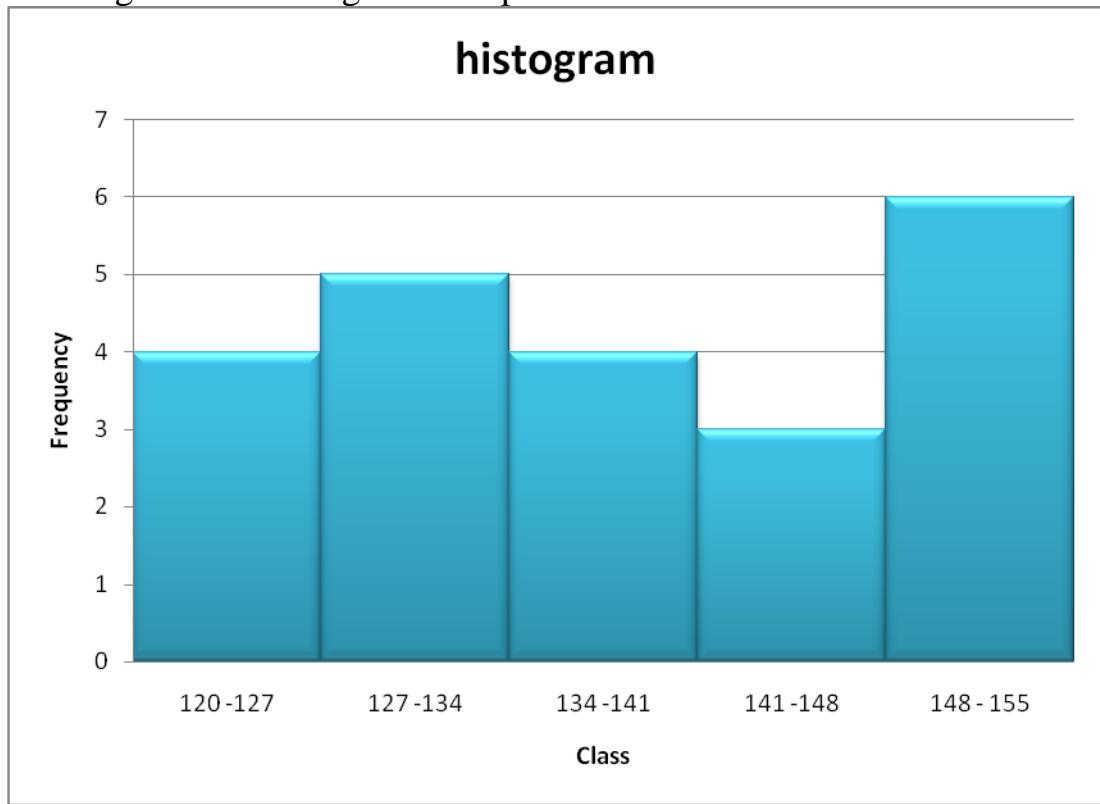
What is the relative frequency of plants that length between (134-141) cm?

The relative frequency = **4/22 = 0.18**

Example (8)

If you have 115 student Scores ranging between 30 - 92 . Using 2^k rule in determining the number of classes, what is the class interval?

- n = 150
- Range = H-L = 92-30 = 62
- The number of classes (k)
  2k > n   2k > 115   k=7
- Width or class interval
  i ≥ (H-L)/k
  i ≥ 62/7
  i ≥ 8.86
  i ≥ 9