Relative frequency and percentage frequency

1- Frequency: It determines the number of observations falling into each category.

2- Relative frequency: It determines the proportion of observation in the particular class relative to the total observations.

This **relative frequency** of a particular observation or class limit is found by dividing the frequency (**F**) by the number of observations (**N**): that is, (**F ÷ N**).

Relative frequency = frequency ÷ number of observations

3- Relative frequency distribution: is a tabular summary of a set of data showing the relative frequency for each class.

4- Percent frequency is the relative frequency multiplied by 100

The **percentage frequency** is found by multiplying each relative frequency value by 100. Thus:

Percentage frequency = relative frequency x 100 = f ÷ n x100

Example1: Construct the Percentage frequency and relative frequency distribution for the following data:

62	58	58	52	48	53	54	63	69	63
57	56	46	48	53	56	57	59	58	53
52	56	57	52	52	53	54	58	61	63

Sol:

1- Largest value (X_L) = 69, Lowest value (X_S) =46

2- Total Range (TR) = (69- 46) +1= 24

3-K=1+3.322log(30) = 5.9~6(Rounded off)

4-Class width (L) = 24/6 = 4

Use 46 (minimum value) as first lower limit. Add the class width of 4 to get the lower limit of the next class

Upper limit = 46 + 4 -1 = 50 -1= 49

Class Interval	**Frequency (Fi)**	**Relative Frequency**	**Percentage Frequency**	**Midpoint (X)**
46 – 49	3	3/30 = 0.1	3/30x100=10	47.5
50 – 53	8	8/30 = 0.27	8/30x100=27	51.5
54 – 57	8	8/30 = 0.27	8/30x100=27	55.5
58 – 61	6	6/30 = 0.2	6/30x100=20	59.5
62 – 65	4	4/30 = 0.13	4/30x100=13	63.5
66 – 69	1	1/30 = 0.03	1/30x100=3	67.5
Total	$\sum = 30$	1	$\sum = 100$	

Example 2:

Class Interval	**Frequency (Fi)**	**Relative Frequency**	**Percentage Frequency**	**Midpoint (X)**
10 - 12	5	5/20 = 0.25	0.25x100=25	11
13 - 15	6	6/20 = 0.30	0.3x100=30	14
16 - 18	3	3/20 = 0.15	0.15x100= 15	17
19 - 21	5	5/20 = 0.25	0.25x100=25	20
22 - 24	1	1/20 = 0.05	0.05x100= 5	23
Total	$\sum = 20$	1	$\sum = 100$	

>>>

Cumulative frequency distribution table

A cumulative frequency distribution table is a more detailed table. It looks almost the same as a frequency distribution table but it has added columns that give the cumulative frequency and the cumulative percentage of the results, as well.

Example1: Construct the Cumulative frequency distribution table for the following data:

62	58	58	52	48	53	54	63	69	63
57	56	46	48	53	56	57	59	58	53

52	56	57	52	52	53	54	58	61	63

Sol:

1- Largest value (X_L) = 69, Lowest value (X_S) =46

2- Total Range (TR) = (69- 46) +1= 24

3-K=1+3.322log(30) = 5.9 ~ 6(Rounded off)

4-Class width (L) = 24/6 = 4

Use 46 (minimum value) as first lower limit. Add the class width of 4 to get the lower limit of the next class

Upper limit = 46 + 4 -1 = 50 -1= 49

Class Interval	Frequency (Fi)	Cumulative frequency	Cumulative percentage(%)
46 – 49	3	3	3/30x100=10
50 – 53	8	8+3 = 11	11/30x100= 37
54 – 57	8	11+8=19	19/30x100= 63
58 – 61	6	19+6=25	25/30x100= 83
62 – 65	4	25+4=29	29/30x100= 97
66 – 69	1	29+1=30	30/30x100= 100
Total	$\sum$ = 30		

Tables for Qualitative Data

Ex: A sample of 10 students were examined by certain teacher and the results of examination was as below:

1. good 2. very good 3. good
4. excellent 5. poor 6. very good
7. good 8. poor 9. excellent
10. poor

Sol:

Results	Frequency	Relative Frequency	Percentage Frequency %	Cumulative Frequency	Cumulative Frequency %
Poor	3	0.3	30	3	30
Good	3	0.3	30	6	60
Very good	2	0.2	20	8	80

Excellent	2	0.2	20	10	100
Total	10		100		

Cross Tabulation: is a tabular summary of data for two variables

Crosstabulation can be used when:

1) one variable is qualitative and the other is quantitative
2) both variables are qualitative, or
3) both variables are quantitative

The left and top margin labels define the classes for the two variables

Ex1:

Length	**143**	**146**	**153**	**140**	**155**	**154**	**157**	**148**	**149**	**152**	**146**	**144**
Weight	**55**	**52**	**57**	**59**	**65**	**57**	**64**	**51**	**59**	**54**	**55**	**52**

Sol:

Length: Range=(157-140) +1=18 , lower limit = Xs = 140

K=1+3.322log(12) = 4.5~5, Upper limit = 140 + 4-1 = 143

Class width =18/5 = 3.6~ 4

Weight:

Range=(65-51)+1 = 15, lower limit = Xs = 51

Class width=15/5 = 3, Upper limit = 51 + 3-1 = 53

Weight / Length	51-53	54-56	57-59	60-62	63-65	Total
140-143	-	1	1	-	-	2
144-147	2	1	-	-	-	3
148-151	1	-	1	-	-	2
152-155	-	1	2	-	1	4
156-159	-	-	-	-	1	1
Total	3	3	4	-	2	12

Ex2: A sample of 15 patients were examined and their age were recorded. Construct a cross tabulation for the variables type of refractive error and gender

Types of refractive error (R.E)	Age
Myopia	25
Hyperopia	42
Myopia	15
Myopia	24
Hyperopia	43
Astigmatism	17
Myopia	16
Astigmatism	18
Myopia	13
Hyperopia	46
Astigmatism	32
Myopia	16
Hyperopia	38
Astigmatism	10
Hyperopia	40

Sol:

Age: Range=(46-10) +1= 37

K=1+3.322log(15) = ~ 5

Class width = 37/5 = 7.4 ~ 7

Lower limit = 10

Upper limit = 10 + 7-1= 16 } first interval = 10 – 16

Age / R.E .	10-16	17-23	24-30	31-37	38-44	45-55
Myopia	4	-	2	-	-	-
Hyperopia	-	-	-	-	4	1
Astigmatism	1	2	-	1	-	-
Total	5	2	2	1	4	1