Frequency Distributions

The studied statistical phenomena take many and repeated numerical values, and sometimes the observed results are not numerical, in these cases they can be converted to numerical values, for example, "yes" or "no" or "true" or "false" can be converted to "for" or "against" and thus to "1" or "zero", which allows us to form frequency tables.

Classifying and tabulating the studied data necessarily means arranging this data in ascending or descending order, which allows us to extract a clear picture of the range in which the data ranges over a number of categories, considering these categories as aspects of the studied phenomenon, where the information is unloaded on the basis of thesecategories, and then the number corresponding to each category is determined to deduce the frequencies of the numerical values within their categories, and

we call the table that includes the categories and their corresponding frequencies the (Frequency Distribution Table).

Example (1):

The following readings represent the speed of vehicles measured to the nearest km/h for a sample on the Hilla-Baghdad Road. This is a simplified way to display the data in rows arranged in ascending or descending order.

37	61	76	40	54	74	37	48	47	53
40	63	63	68	57	55	59	54	52	56
87	74	51	54	57	59	46	41	44	58
65	67	64	60	82	51	50	54	51	55
67	57	59	84	66	50	50	56	56	32
47	45	61	40	63	60	53	54	52	51
70	45	73	76	67	43	50	61	71	55
57	53	65	61	55	41	77	56	64	52
36	50	59	62	42	72	73	68	48	69
46	55	60	70	70	58	65	53	71	78

Solution/

32	43	50	52	54	57	60	63	68	73
36	44	50	52	55	57	60	64	68	74
37	45	50	53	55	57	60	64	69	74
37	45	50	53	55	57	61	65	70	76
40	46	50	53	55	58	61	65	70	76
40	46	51	53	55	58	61	65	70	77
40	47	51	54	56	59	61	66	71	78
41	47	51	54	56	59	62	67	71	82
41	48	51	54	56	59	63	67	72	84
42	48	52	54	56	59	63	67	73	87

As shown in the table above, the lowest value is (32) and the highest value is (87), so the difference between these two values represents the range.

Rang = Max - Min…… (1)

Rang = 87- 32= 55

We calculate the number of classes needed using the following equation

N = 1 + 3.322log(n)…… (2)

When:

N= Number of classes

n= Number of values

N=1 + 3.322log (100)

N = 7.644 ≅ 8.

We calculate the length of the class

Class interval=Rang/N……. (3)

Class interval= 55/8=6.87 ≅ 7

Class Center = (max of class + min of class) /2) ……. (4)

Relative frequency=Frequency/n …… (5)

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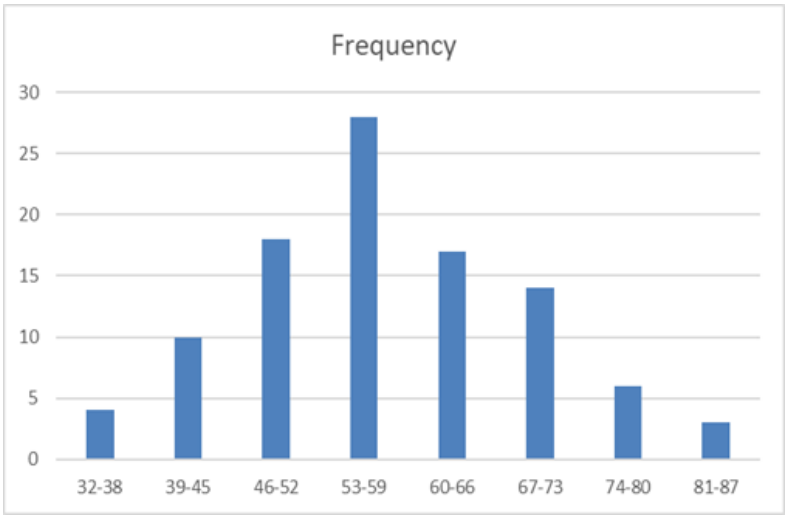
class	Frequency	Class Center	Relative frequency	Cumulative Frequency
32−38	4	35	0.04	4
39−45	10	42	0.1	14
46−52	18	49	0.18	32
53−59	28	56	0.28	60
60−66	17	63	0.17	77
67−73	14	70	0.14	91
74−80	6	77	0.06	97
81−87	3	84	0.03	100



Frequency histogram

A frequency histogram is a set of adjacent rectangles with the same width representing the length of the equal categories, but with different lengths, where

H.W/

A number of students in statistics obtained the following grades

37	61	76	40	54
74	37	48	47	53
40	63	63	68	57
55	59	54	52	56

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