AG060-310 Applied Statistics for Ago-Industry

Topic

Basic statistics and application of statistics in Agro-industry (Part II)

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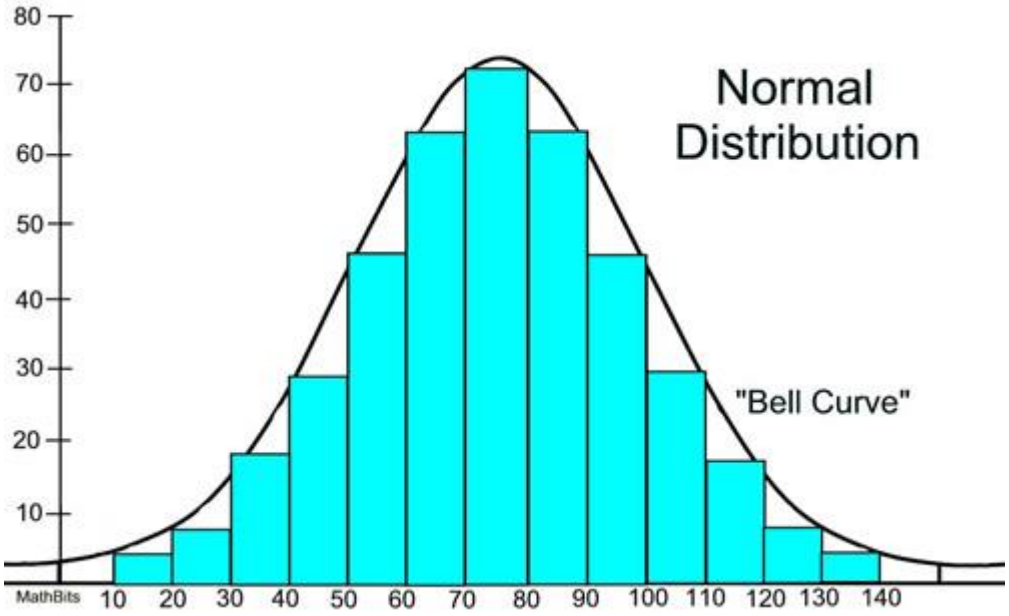
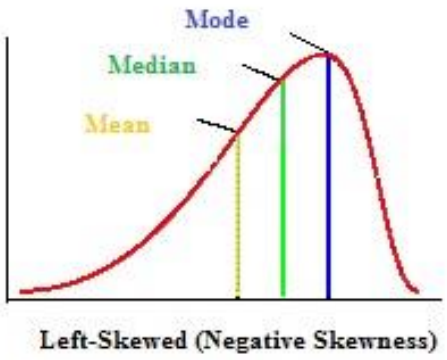
Graphs for quantitative variables

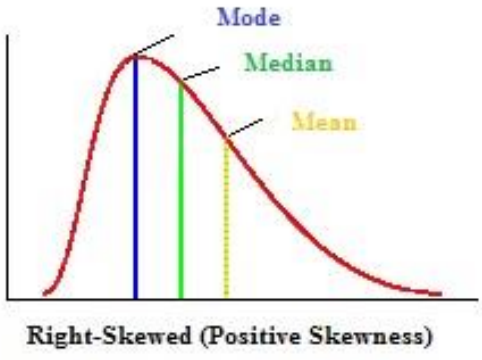
A histogram

A histogram is similar in appearance and construction to a bar graph, but it is used for quantitative variable rather than qualitative variables





Left-Skewed (Negative Skewness)



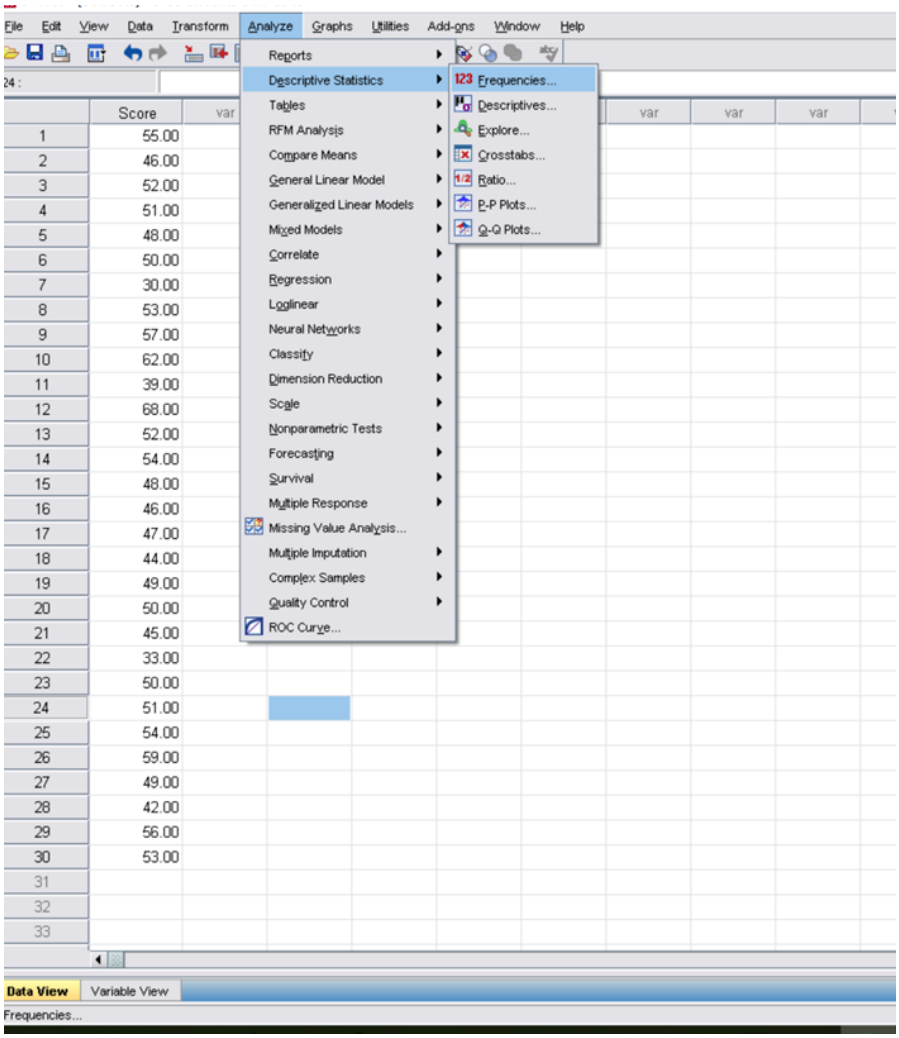
Right-Skewed (Positive Skewness)

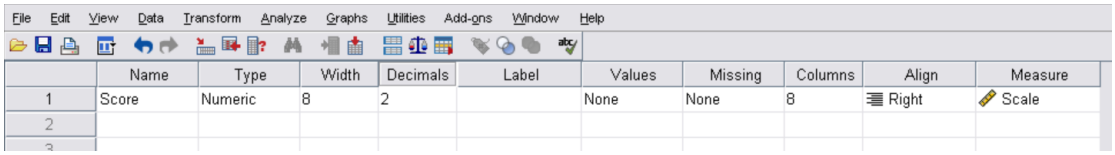
How to plot by program computer?

Table 1 The score from the consumer

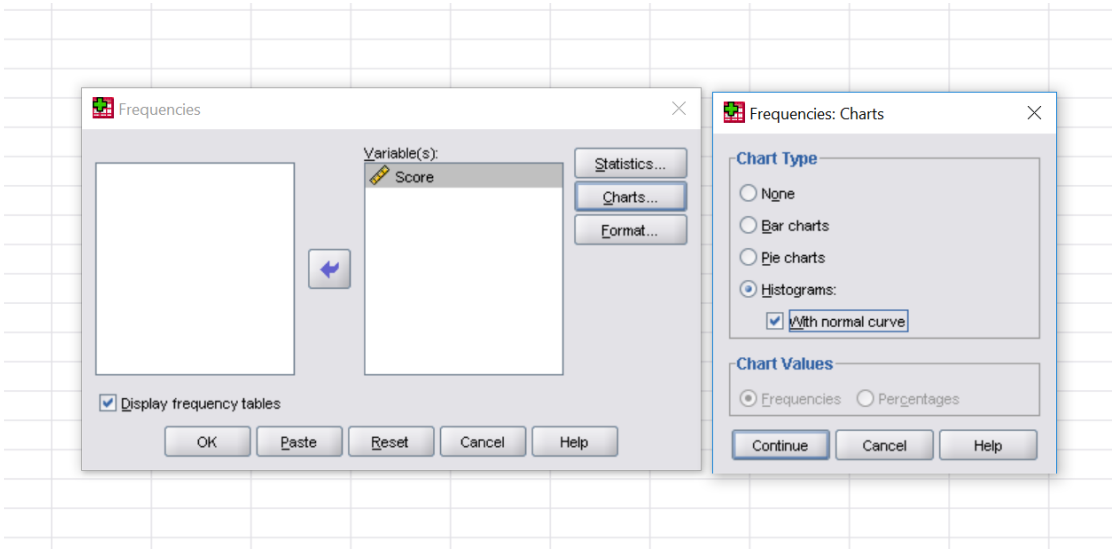
55	39	45
46	68	33
52	52	50
51	54	51
48	48	54
50	46	59
30	47	49
53	44	42
57	49	56
62	50	53

Descriptive Statistics----Frequencies

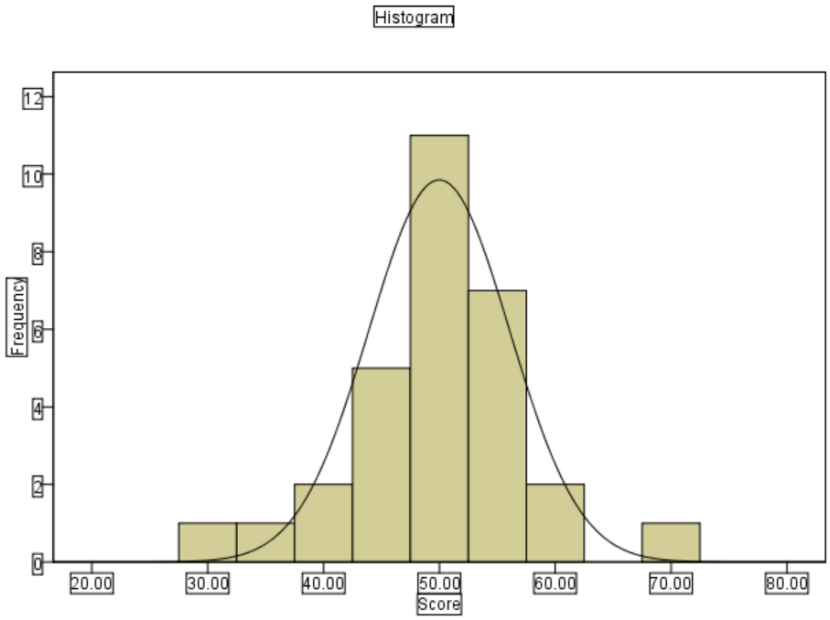




Charts-Histograms—with normal curve—continue---ok.



Output



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Exercise

1 A marriage counselor asked his clients to keep a record of the number of arguments they had during the week. The following data for 23 couples were obtained (couple)

2	5	4	9	6
4	3	3	5	10
5	0	13	4	2
4	5	4	4	

2 Assembly-line workers were asked to complete a job-satisfaction questionnaire. Construct an ungrouped frequency distribution for the following scores, where large scores correspond to high satisfaction (score)

7	8	4	25	9	8	4	15	11	9
6	9	7	7	10	17	5	10	5	8
3	7	11	8	13	22	7	8	7	6
10	6	7	9	4	8	6	6	8	11
15	21	5	11	6	9	5	12	10	8

3 A test of hardness of cake (N)

80	73	51	81	46	85	84
75	44	84	77	95	48	88
50	35	52	93	43	59	63
47	66	55	58	62	51	75
86	82	89	51	77	73	59

4 A time of starch to be dissolve in the water (second)

186	187	211	185	196	193
184	185	191	188	192	190
188	190	202	199	189	
193	186	180	205	187	
189	195	184	198	202	

5 Number of the chocolate bar consumer (n)

10	9	11	12	6	14	10	12
11	10	12	10	9	11	16	8
9	7	8	11	10	8	12	12
13	10	10	9	11	13	7	11

Measures of central tendency

Central tendency is arguably the most interesting and important characteristic of data. The most important property of data is unusually its central tendency, the score value on which a distribution centers. The value is popularly called the averages. However, in case of these different connotations, statisticians prefer to use the more precise terms of mode, mean, and median in referring to the central tendency of a distribution.

The **Mode** is the score or qualitative category that occurs with the greatest
Example Find the mode of the following series: 12 14 14 15 11 12 15 14 14 16 12 15
Answer There are twelve observations in the series therein the number 14 occurs maximum number of times fourth. The mode is therefore 14.

The **mean** is the most widely used and familiar measure of central tendency. It is the arithmetic mean-the sum of scores divided by the number of scores
Example Find the mean of the following series: 12 14 14 15 11 12 15 14 14 16 12 15

Answer $\text{Average} = \frac{\sum_{i=1}^{n} x_i}{n}$

= (12+14+14+15+11+12+15+14+14+16+12+15) / 12 = 13.6=14

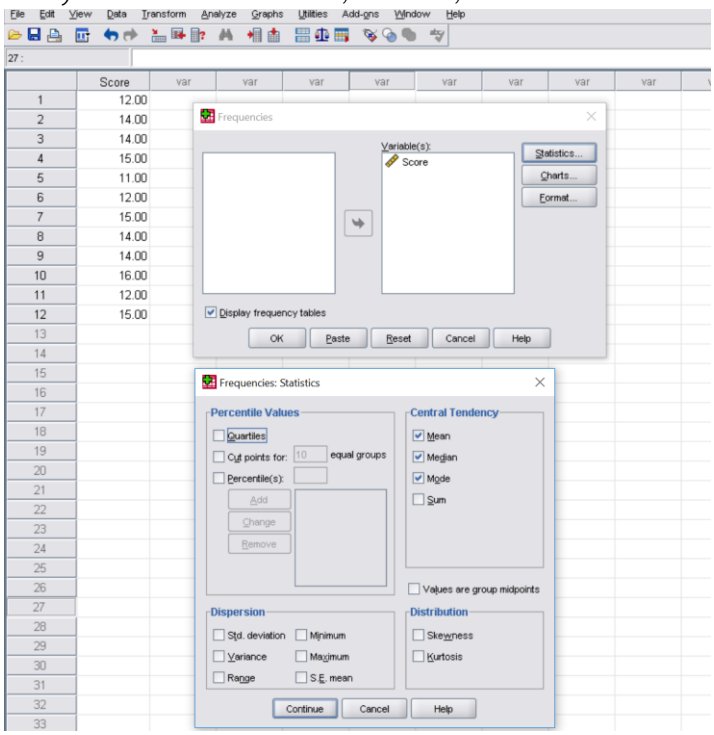
The **median** is the point is a distribution that divides the data into two groups having equal frequency.

Example Find the median of the following series: 12 14 14 15 11 12 15 14 14 16 12 15

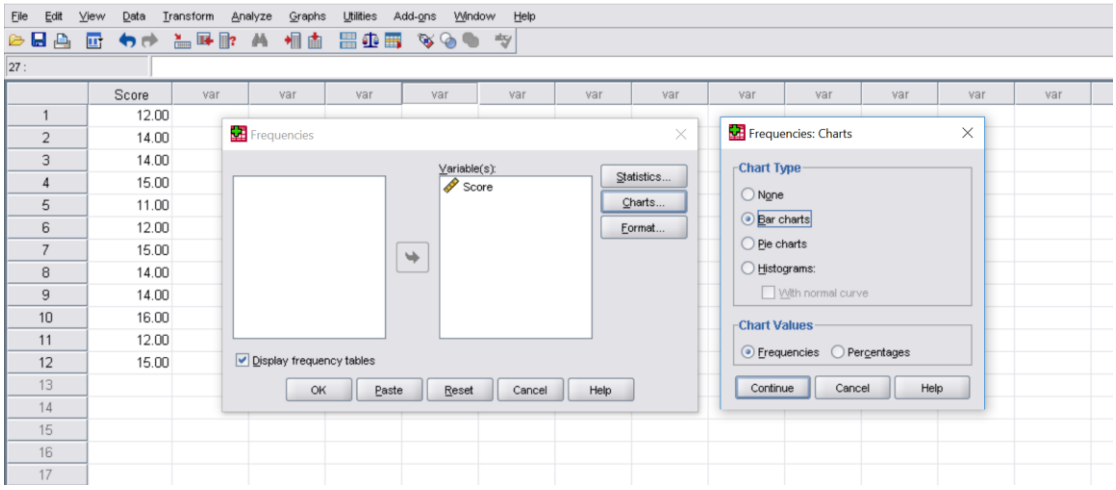
Answer = 12 14 14 15 11 12 15 14 14 16 12 15

11 12 12 12 14 14 14 14 15 15 15 16 (เรียงลำดับใหม่) = (14+14)/2 = 1

Analyze---statistics---mean, median, mode---continue—o.k.



Analyze—Charts-Bar charts—Continue—o.k.

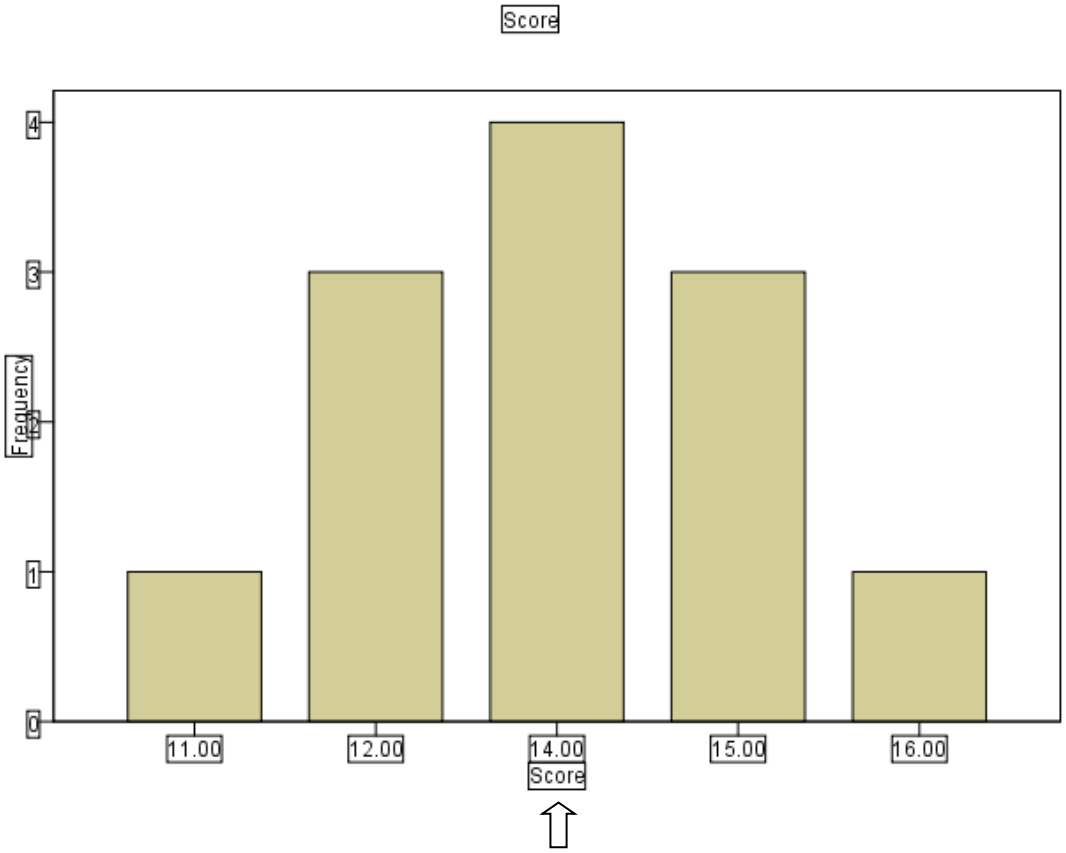


Output

Statistics

Score

N	Valid	12
	Missing	0
Mean		13.6667
Median		14.0000
Mode		14.00



Example 2 Determine the mode mean and median for the following

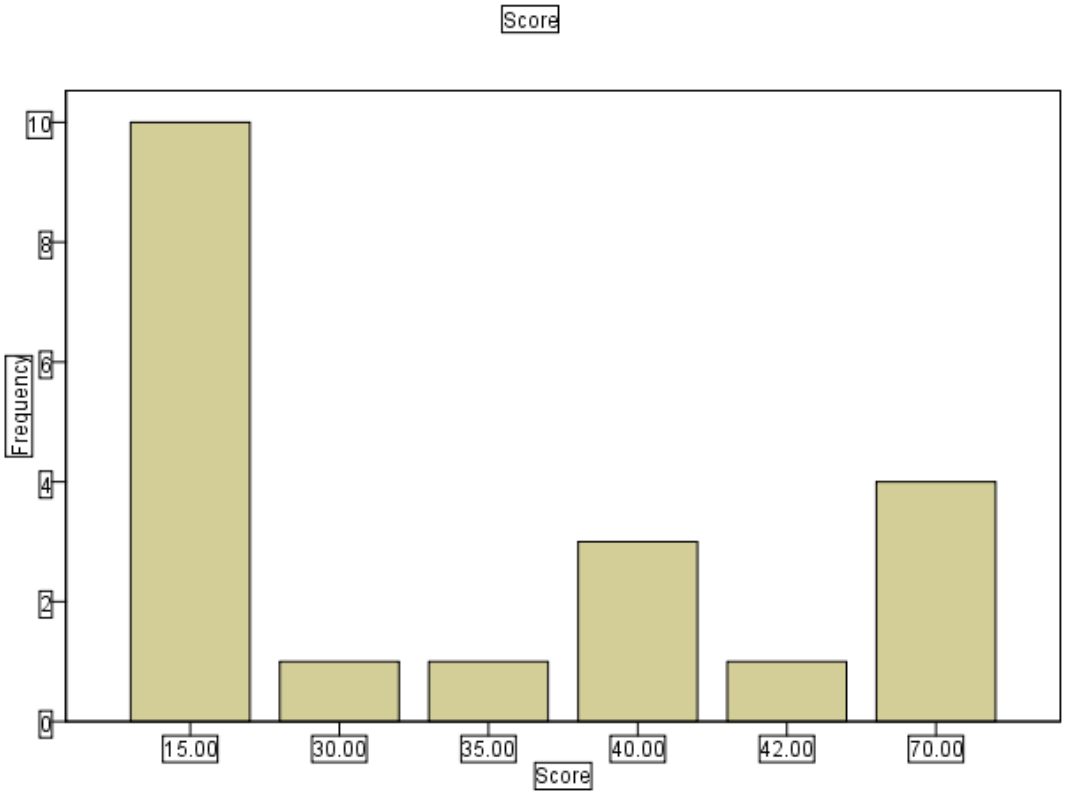
70	15	70	70	30
40	40	40	15	15
70	15	15	15	15
15	42	35	15	15

Output

Statistics

Score

N	Valid	20
	Missing	0
Mean		32.8500
Median		22.5000
Mode		15.00



Exercise 1 For the following sets of data, what measures of central tendency would you compute?

Case 1	9	6	5	7	1	6	7
	8	10	6	5	3	6	9
	7	4	5	6	8	3	2
Case 2	6	5	9	6	7	5	6
	8	3	4	5	7	5	4
	8	5					
Case 3	3	5	8	7	9	4	2
	5	6	6	3			
Case 4	23	24	21	19	21	24	25
	22	21	27				
Case 5	5	6	4	5	10	6	3
	5	6	7	3	4	5	8
	5	4	7	1	6	7	

References

Lyman Ott, R. 2010. An introduction to statistical methods and data analysis. Brooks/Cole, Cengage Learning, 1273 p.

Roger E. Kirk. 2008. Statistics: An introduction. Thomson Wadsworth, Canada, 649 p.

https://mathbitsnotebook.com/Algebra2/Statistics/STnormalDistribution.html