

KARPAGAM ACADEMY OF HIGHER EDUCATION (Deemed to be University Established Under Section 3 of UGC Act 1956) Pollachi Main Road, Eachanari (Post) Coimbatore -641 021 DEPARTMENT OF MATHEMATICS

| SUBJECT: STATISTICAL PACKAGE USING SPSS | SEMESTER I | LTPC |
|---|------------|------|
| SUBJECT CODE:17BAU112 | | 0031 |

1.Introduction to SPSS Package

- 2.Working with windows of SPSS
- **3.Defining variables in variable view window in SPSS**
- 4. Drawing of simple and Multiple bar diagrams in SPSS Package
- 5.Drawing of Histogram and Pie diagram
- 6.Calculation of Mean for individual ,discrete series using SPSS package
- 7.Mean for continuous series using SPSS package
- 8.Median for individual and discrete series using SPSS package
- 9. Median for continuous series using SPSS package
- **10.Mode for individual and discrete series using SPSS package**
- **11.Standard deviation for individual and discrete series using SPSS package**
- 12.Coefficient of variation for individual and discrete series using SPSS package
- 13.Karl pearson 's correlation using SPSS package
- 14.Rank correlation Coefficient using SPSS package

Karpagam Academy of Higher Education

(Deemed to be University Established Under Section 3 of UGC Act 1956) POLLACHI MAIN ROAD, EACHANARI (PO), COIMBATORE –641 021



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DEPARTMENT OF MANAGEMENT BACHELOR OF BUSINESS ADMINISTRATION STATISTICAL PACKAGE USING SPSS (PRACTICAL)

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DEPARTMENT OF MANAGEMENT

BACHELOR OF BUSINESS ADMINISTRATION

STATISTICAL PACKAGE USING SPSS (PRACTICAL)

BONAFIDE CERTIFICATE

| REG.NO | | SUBJECT CODE | |
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This is to certify that this is a bonafide record of work.

done by ______ of _____

during the year 2017 - 2018 for the Practical Examination

held on ______ at Karpagam University, Coimbatore-21.

Staff-in-charge

Head of the Department

Internal Examiner

External Examiner

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INTRODUCTION TO SPSS PACKAGE

Date:

Introduction: What is SPSS?

- Originally it is an acronym of Statistical Package for the Social Science but now it stands for Statistical Product and Service Solutions
- One of the most popular statistical packages which can perform highly complex data manipulation and analysis with simple instructions

The basics of managing data files:

Opening SPSS

 $Start \rightarrow All \ Programs \rightarrow SPSS \ Inc \rightarrow SPSS$

The default window will have the data editor.

Saving the data:

To save the data file you created simply click 'file' and click 'save as.' You can save the file in different forms by clicking "Save as type."

WORKING WITH WINDOWS OF SPSS

Date:

Windows in SPSS:

The Four Windows:

- Data editor
- Output viewer
- Syntax editor
- Script window

Data Editor

This window is aspreadsheet-like system for defining, entering, editing, and displaying data. Extension of the saved file will be "sav."

Output Viewer

This windowdisplays output and errors. Extension of the saved file will be "spv."

Syntax editor

This window is a text editor for syntax composition. Extension of the saved file will be "sps."

Script Window

This window provides the opportunity to write full-blown programs, in a BASIC-like language. Extension of the saved file will be "sbs."

DEFINING VARIABLES IN VARIABLE VIEW WINDOW IN SPSS

Date:

Sheets in Data Editor:

There are two sheets in the window:

- 1. Data view
- 2. Variable view

Data View window

This sheet is visible when we first open the Data Editor and this sheet contains the data.

Variable View window

This sheet contains information about the data set that is stored with the dataset.

- Name
 - > The first character of the variable of the variable name must be alphabetic.
 - ▶ Variable names must be unique, and have to be less than 64 characters.
 - Spaces are not allowed.
- Type
 - Click on the "type" box. The two basic types of variables that we will use are numeric and string. This column enables us to specify the type of variable.
- Width
 - Width allows us to determine the number of characters SPSS will allow to be entered for the variable
- Decimals
 - Number of decimals
 - \blacktriangleright It has to be less than or equal to 16
- Label
 - You can specify the details of the variable
 - > You can write characters with spaces up to 256 characters
- Values
 - This is used and to suggest which numbers represent which categories when the variable represents a category

Defining the value labels

- Click the cell in the values column as
- For the value, and the label, we can put up to 60 characters.
- After defining the values click add and then click OK.

Ex. No: 4A

DRAWING OF SIMPLE BAR DIAGRAM

Date:

Question:

Guests staying at Marada Inn were asked to rate the quality of their accommodations as being excellent, above average, average, below average or poor. The ratings provided by a sample of 20 guest are,

| Below Average | Average | Above Average |
|---------------|---------------|---------------|
| Above Average | Above Average | Above Average |
| Above Average | Below Average | Below Average |
| Average | Poor | Poor |
| Above Average | Excellent | Above Average |
| Average | Above Average | Average |
| Above Average | Average | |

Aim:

To draw the simple bar diagram using SPSS package.

| Rating | Frequency |
|---------------|-----------|
| Poor | 2 |
| Below Average | 3 |
| Average | 5 |
| Above Average | 9 |
| Excellent | 1 |
| Total | 20 |

Statistics

Rating

| N | Valid | 20 |
|---|---------|----|
| | Missing | 0 |



Rating

Result:

Bar diagram was drawn for the given data using SPSS package.

Ex. No: 4B

DRAWING OF MULTIPLE BAR DIAGRAM

Date:

Question:

The percentage distributions of household income in two regions are:

| Income | Region A | Region B |
|--------|----------|----------|
| 1000 | 5 | 4 |
| 2000 | 6 | 5 |
| 3000 | 4 | 3 |
| 4000 | 3 | 2 |
| 5000 | 2 | 6 |

Aim:

To draw multiple bar diagram using SPSS package.

| Income | Region A | Region B |
|--------|----------|----------|
| 1000 | 5 | 4 |
| 2000 | 6 | 5 |
| 3000 | 4 | 3 |
| 4000 | 3 | 2 |
| 5000 | 2 | 6 |
| Total | 20 | 20 |



Household Income

Result:

Multiple bar diagram was drawn for the given data using SPSS package.

Ex. No: 5A

DRAWING OF PIE DIAGRAM

Date:

Question:

Grades of 30 students in recent test:

| А | В | С | D |
|---|----|----|---|
| 5 | 12 | 10 | 3 |

Aim:

To draw pie chart using SPSS package.

| Grades | Frequency | Degrees |
|--------|-----------|-------------|
| А | 5 | 60 degrees |
| В | 12 | 144 degrees |
| С | 10 | 120 degrees |
| D | 3 | 36 degrees |
| | 30 | 360 degrees |

Statistics

grades

| N | Valid | 30 |
|---|---------|----|
| | Missing | 0 |



Result:

Pie diagram was drawn for the given data using SPSS package.

Ex. No: 5B

DRAWING OF HISTOGRAM

Date:

Question:

Daily wages of 80 workers in an industry are:

| Daily Wages | Number of Workers |
|-------------|----------------------|
| 0-50 | 8 |
| 50 - 100 | 16 |
| 100 - 150 | 27 |
| 150 - 200 | 19 |
| 200 - 250 | 10 |

Aim:

To draw histogram using SPSS package.

| Daily Wages | m | Number of Workers |
|-------------|-----|-------------------|
| 0-50 | 25 | 8 |
| 50 - 100 | 75 | 16 |
| 100 - 150 | 125 | 27 |
| 150 - 200 | 175 | 19 |
| 200 - 250 | 225 | 10 |



Result:

Histogram was drawn for the given data using SPSS package.

Ex. No: 6A

CALCULATION OF MEAN FOR INDIVIDUAL SERIES

Date:

Question:

Calculate the arithmetic mean for the data given below:

| X 25 18 27 10 20 42 20 53 20 | | | | | | | | | | |
|--|---|----|----|----|----|----|----|----|----|----|
| X 23 18 27 10 30 42 20 33 20 | Х | 25 | 18 | 27 | 10 | 30 | 42 | 20 | 53 | 20 |

Aim:

To calculate the arithmetic mean for individual series from the following data using SPSS package.

| X 25 18 27 | 10 30 | 42 20 | 53 20 |
|------------|-------|-------|-------|
|------------|-------|-------|-------|

Formula:

Arithmetic Mean $\overline{X} = \Sigma X / N$

where N = number of item.

Calculation:

| Х |
|----|
| 25 |
| 18 |
| 27 |
| 10 |
| 30 |
| 42 |
| 20 |
| 53 |
| 20 |
| |

 $\Sigma X = 245$

Arithmetic Mean = 245/9

=27.22

Statistics

| Х | | |
|------|---------|-------|
| N | Valid | 9 |
| | Missing | 0 |
| Mean | | 27.22 |

Result:

Arithmetic mean is calculated for the given individual series using SPSS package.

Ex. No: 6B

CALCULATION OF MEAN FOR DISCRETE SERIES

Date:

Question:

Calculate the arithmetic mean for the following data using SPSS package.

| No of members (X) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|----------------------|---|---|---|---|----|----|---|---|---|----|----|----|
| Frequency (f) | 1 | 3 | 5 | 6 | 10 | 13 | 9 | 5 | 3 | 2 | 2 | 1 |

Aim:

To calculate the arithmetic mean for discrete series from the following data using SPSS package.

Formula:

Arithmetic Mean $\overline{X} = \Sigma f X / N$

where N = number of item.

Calculation:

| Х | f | fX | |
|----|-----------------|--------------------|--|
| 1 | 1 | 1 | |
| 2 | 3 | 6 | |
| 3 | 5 | 15 | |
| 4 | 6 | 24 | |
| 5 | 10 | 50 | |
| 6 | 13 | 78 | |
| 7 | 9 | 63 | |
| 8 | 5 | 40 | |
| 9 | 3 | 27 | |
| 10 | 2 | 20 | |
| 1 | 2 | 22 | |
| 12 | 1 | 12 | |
| | $\Sigma f = 60$ | $\Sigma f X = 358$ | |

Arithmetic mean $\overline{X} = \Sigma f X / N$ = 358/60 = 5.97



Result:

Arithmetic mean is calculated for the given discrete series using SPSS package.

CALCULATION OF MEAN FOR CONTINUOUS SERIES

Date:

Question:

Calculate the arithmetic mean for the following data using SPSS package.

| Income(in 1000) | 0 – 10 | 10-20 | 20 - 30 | 30-40 | 40 - 50 | 50 - 60 | 60 - 70 |
|------------------|--------|-------|---------|-------|---------|---------|---------|
| No. of Person | 6 | 8 | 10 | 12 | 7 | 4 | 3 |

Aim:

To calculate the arithmetic mean for continuous series from the following data using SPSS package.

| Income(in 1000) | 0 – 10 | 10 – 20 | 20 - 30 | 30 - 40 | 40 - 50 | 50 - 60 | 60 - 70 |
|-----------------|--------|---------|---------|---------|---------|---------|---------|
| No. of | 6 | 8 | 10 | 12 | 7 | 4 | 3 |
| Person | | | | | | | |

Formula:

Arithmetic mean $\overline{X} = \Sigma fm/N$

where $N = \Sigma f$

Calculation:

| Х | m | f | fm |
|---------|----|-----------------|--------------------|
| 0 - 10 | 5 | 6 | 30 |
| 10 - 20 | 15 | 8 | 120 |
| 20 - 30 | 25 | 10 | 250 |
| 30 - 40 | 35 | 2 | 410 |
| 40 - 50 | 45 | 7 | 315 |
| 50 - 60 | 55 | 4 | 220 |
| 60 - 70 | 65 | 3 | 195 |
| | | $\Sigma f = 50$ | $\Sigma fm = 1550$ |

Arithmetic mean $\overline{X} = \Sigma fm/N$

= 31

Statistics

| Х | | |
|------|---------|-------|
| N | Valid | 50 |
| | Missing | 0 |
| Mean | | 31.00 |

Result:

Arithmetic mean is calculated for the given continuous series using SPSS package.

Ex. No: 8A

CALCULATION OF MEDIAN FOR INDIVIDUAL SERIES

Date:

Case(i):

Question:

Calculate the median for the data given below:

| Х | 25 | 18 | 27 | 10 | 30 | 42 | 20 | 53 | 20 |
|---|----|----|----|----|----|----|----|----|----|
| | | | | | | | | | |

Aim:

To calculate the median for individual series from the following data using SPSS package.

| X 25 18 27 10 30 42 20 53 20 | | | | | | | | | | |
|------------------------------|---|----|----|----|----|----|----|----|----|----|
| | Х | 25 | 18 | 27 | 10 | 30 | 42 | 20 | 53 | 20 |

Formula:

Median = Size of [(N + 1)/2] th item

Where N = number of observation

Calculation:

Here N = 9 (N is an odd number)

The given values in ascending order is

| Х | |
|----|--|
| 10 | |
| 18 | |
| 20 | |
| 20 | |
| 25 | |
| 27 | |
| 30 | |
| 42 | |
| 53 | |
| | |

Median = Size of [(N + 1)/2] th item

= Size of [(9+1)/2] th item

= Size of [10/2] th item

= Size of 5th item

Median = 25

Statistics

| Х | | |
|-----|---------|-------|
| N | Valid | 9 |
| | Missing | 0 |
| Med | lian | 25.00 |

Result:

Median is calculated for the given individual series using SPSS package.

Case(ii): Question:

Calculate the median for the data given below:

| Х | 21 | 7 | 9 | 0 | 15 | -2 | 6 | 3 | -4 | 7 |
|------|----|---|---|---|----|----|---|---|----|---|
| Aim: | | | | | | | | | | |

To calculate the median for individual series from the following data using SPSS package.

| Х | 21 | 7 | 9 | 0 | 15 | -2 | 6 | 3 | -4 | 7 | |
|---|----|---|---|---|----|----|---|---|----|---|--|
|---|----|---|---|---|----|----|---|---|----|---|--|

Formula:

Median = Size of [(N + 1)/2] th item

Where N = number of observation

Calculation:

Here N = 10 (N is an even number)

The given values in ascending order is

| Х |
|----|
| -4 |
| -2 |
| 0 |
| 3 |
| 6 |
| 7 |
| 7 |
| 9 |
| 15 |
| 21 |

Median = Size of [(N + 1)/2] th item

- = Size of [(10+1)/2] th item
- = Size of [11/2] th item
- = Size of 5.5th item
- = (Size of 5^{th} item + Size of 6^{th} item)/ 2

$$=(6+7)/2$$

Median = 6.5

Statistics

| Х | | |
|-----|---------|-----|
| N | Valid | 9 |
| | Missing | 0 |
| Med | ian | 6.5 |

Result:

Median is calculated for the given individual series using SPSS package.

CALCULATION OF MEDIAN FOR DISCRETE SERIES

Date:

Question:

Calculate the median for the following data using SPSS package.

| No of members (X) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|----------------------|---|---|---|---|----|----|---|---|---|----|----|----|
| Frequency (f) | 1 | 3 | 5 | 6 | 10 | 13 | 9 | 5 | 3 | 2 | 2 | 1 |

Aim:

To calculate the median for discrete series from the following data using SPSS package.

Formula:

Median = Size of [N + 1/2] th item

where $N = \Sigma f$

| Х | f | fX |
|----|-----------------|----|
| 1 | 1 | 1 |
| 2 | 3 | 6 |
| 3 | 5 | 15 |
| 4 | 6 | 24 |
| 5 | 10 | 50 |
| 6 | 13 | 78 |
| 7 | 9 | 63 |
| 8 | 5 | 40 |
| 9 | 3 | 27 |
| 10 | 2 | 20 |
| 1 | 2 | 22 |
| 12 | 1 | 12 |
| | $\Sigma f = 60$ | |

Median = Size of [N + 1/2] th item

- = Size of [60 + 1/2] th item
- = Size of [61/2] th item
- = Size of [30.5]th item

Median = 6



Result:

Median is calculated for the given discrete series using SPSS package.

CALCULATION OF MEDIAN FOR CONTINUOUS SERIES

Date:

Question:

Calculate the median for the following data using SPSS package.

| Income(in | 0 - 10 | 10 - 20 | 20 - 30 | 30 - 40 | 40 - 50 | 50 - 60 | 60 - 70 |
|-----------|--------|---------|---------|---------|---------|---------|---------|
| 1000) | | | | | | | |
| No. of | 6 | 8 | 10 | 12 | 7 | 4 | 3 |
| Person | | | | | | | |

Aim:

To calculate the median for continuous series from the following data using SPSS package.

| Income(in | 0 - 10 | 10 - 20 | 20 - 30 | 30 - 40 | 40 - 50 | 50 - 60 | 60 - 70 |
|-----------|--------|---------|---------|---------|---------|---------|---------|
| 1000) | | | | | | | |
| No. of | 6 | 8 | 10 | 12 | 7 | 4 | 3 |
| Person | | | | | | | |

Formula:

$$Median = L + \left[\left[\frac{N}{2} - cf \right] / f * i \right]$$

Position of median = N/2

where $N = \Sigma f$

L = lower boundary of the class interval

cf = cumulative frequency of the class preceding the median class interval

f = frequency of the class interval

i = difference of the class interval

Calculation:

| Х | m | f | cf |
|---------|----|-----------------|----|
| 0 - 10 | 5 | 6 | 6 |
| 10 - 20 | 15 | 8 | 14 |
| 20 - 30 | 25 | 10 | 24 |
| 30 - 40 | 35 | 12 | 36 |
| 40 - 50 | 45 | 7 | 43 |
| 50 - 60 | 55 | 4 | 47 |
| 60 - 70 | 65 | 3 | 50 |
| | | $\Sigma f = 50$ | |

Median = Size of N/2th item

= Size of 50/2th item

= Size of 25th item

Median class interval is 30 - 40

Median = L+
$$\left[\left[\frac{N}{2} - cf\right]/f * i\right]$$

= 30+((25-24)/12)x10
= 30+(1/12)x10
= 30+(5/6)
= 30+0.83

Median = 30.83

Statistics

| Х | | |
|-----|---------|--------------------|
| N | Valid | 50 |
| | Missing | 0 |
| Med | lian | 30.45 ^a |

a. Calculated from grouped data.

Result:

Median is calculated for the given continuous series using SPSS package.

CALCULATION OF MODE FOR INDIVIDUAL SERIES

Date:

Question:

Calculate the mode for the data given below:

| $\begin{array}{ c c c c c c c c c c c c c c c c c c c$ | | Х | 25 | 18 | 27 | 10 | 30 | 42 | 20 | 53 | 20 |
|--|--|---|----|----|----|----|----|----|----|----|----|
|--|--|---|----|----|----|----|----|----|----|----|----|

Aim:

To calculate the mode for individual data using SPSS package.

| Х | 25 | 18 | 27 | 10 | 30 | 42 | 20 | 53 | 20 |
|---|----|----|----|----|----|----|----|----|----|
| | | | | | - | | | | |

Calculation:

| Χ | f |
|----|---|
| 10 | 1 |
| 18 | 1 |
| 20 | 2 |
| 25 | 1 |
| 27 | 1 |
| 30 | 1 |
| 42 | 1 |
| 53 | 1 |

Mode = Value of highest frequency

= 20

Statistics

| Х | | |
|------|---------|----|
| Ν | Valid | 9 |
| | Missing | 0 |
| Mode | | 20 |

Result:

Mode is calculated for the given individual series using SPSS package.

CALCULATION OF MODE FOR DISCRETE SERIES

Date:

Question:

Calculate the mode for the following data using SPSS package.

| No of members (X) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|----------------------|---|---|---|---|----|----|---|---|---|----|----|----|
| Frequency (f) | 1 | 3 | 5 | 6 | 10 | 13 | 9 | 5 | 3 | 2 | 2 | 1 |

Aim:

To calculate the mode for discrete series using SPSS package.

Formula:

Mode = Highly frequented value

| Χ | f |
|----|----|
| 1 | 1 |
| 2 | 3 |
| 3 | 5 |
| 4 | 6 |
| 5 | 10 |
| 6 | 13 |
| 7 | 9 |
| 8 | 5 |
| 9 | 3 |
| 10 | 2 |
| 11 | 2 |
| 12 | 1 |

Statistics

| Х | | |
|------|---------|----|
| N | Valid | 60 |
| | Missing | 0 |
| Mode | | 6 |

Result:

Mode is calculated for the given discrete series using SPSS package.

CALCULATION OF STANDARD DEVIATION FOR INDIVIDUAL SERIES

Date:

Question:

Calculate the standard deviation for the data given below:

| X | 25 | 18 | 27 | 10 | 30 | 42 | 20 | 53 | 20 |
|---|----|----|----|----|----|----|----|----|----|
| | | | | | | | | | |

Aim:

To calculate the standard deviation for individual series from the following data using SPSS package.

| Х | 25 | 18 | 27 | 10 | 30 | 42 | 20 | 53 | 20 |
|---|----|----|----|----|----|----|----|----|----|

Formula:

Standard Deviation =
$$\sqrt{\frac{\Sigma X^2}{N} - \left(\frac{\Sigma X}{N}\right)^2}$$

| Х | X^2 |
|-----------------|---------------------|
| 25 | 625 |
| 18 | 324 |
| 27 | 729 |
| 10 | 100 |
| 30 | 900 |
| 42 | 1764 |
| 20 | 400 |
| 53 | 2809 |
| 20 | 400 |
| Σ <i>X</i> =245 | $\Sigma X^2 = 8051$ |

Standard Deviation =
$$\sqrt{\frac{\Sigma X^2}{N} - \left(\frac{\Sigma X}{N}\right)^2}$$

= $\sqrt{894.555 - 741.049}$
= $\sqrt{153.506}$
= 12.389

Statistics

| Х | | |
|------|-----------|--------|
| N | Valid | 9 |
| | Missing | 0 |
| Std. | Deviation | 13.141 |

Result:

Standard deviation is calculated for the given individual series using SPSS package.

Ex. No: 11B CALCULATION OF STANDARD DEVIATION FOR DISCRETE SERIES Date:

Question:

Calculate the standard deviation for the following data.

| No of members (X) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|----------------------|---|---|---|---|----|----|---|---|---|----|----|----|
| Frequency (f) | 1 | 3 | 5 | 6 | 10 | 13 | 9 | 5 | 3 | 2 | 2 | 1 |

Aim:

To calculate the standard deviation for discrete series from the following data using SPSS package.

Formula:

Standard Deviation =
$$\sqrt{\frac{\Sigma f d^2}{\Sigma f} - \left(\frac{\Sigma f d}{\Sigma f}\right)^2}$$

| Х | f | d=X-A | d^2 | fd | fd ² |
|----|---------------|---------|-------|------------------|---------------------|
| | | (d=X-6) | | | |
| 1 | 1 | -5 | 25 | -5 | 25 |
| 2 | 3 | -4 | 16 | -12 | 48 |
| 3 | 5 | -3 | 9 | -15 | 45 |
| 4 | 6 | -2 | 4 | -12 | 24 |
| 5 | 10 | -1 | 1 | -10 | 10 |
| 6 | 13 | 0 | 0 | 0 | 0 |
| 7 | 9 | 1 | 1 | 9 | 9 |
| 8 | 5 | 2 | 4 | 10 | 20 |
| 9 | 3 | 3 | 9 | 9 | 27 |
| 10 | 2 | 4 | 16 | 8 | 32 |
| 11 | 2 | 5 | 25 | 10 | 50 |
| 12 | 1 | 6 | 36 | 6 | 36 |
| | $\Sigma f=60$ | | | $\Sigma fd = -2$ | $\Sigma fd^2 = 326$ |

Standard Deviation =
$$\sqrt{\frac{\Sigma f d^2}{\Sigma f} - \left(\frac{\Sigma f d}{\Sigma f}\right)^2}$$

= $\sqrt{\left(\frac{326}{60}\right) - \left(\frac{-2}{60}\right)^2}$
= $\sqrt{5.433 - 0.0011}$
= $\sqrt{5.4319}$
= 2.3306

Х

Statistics

| N | Valid | 60 |
|------|-----------|-------|
| | Missing | 0 |
| Std. | Deviation | 2.350 |

Result:

Standard deviation is calculated for the given discrete series using SPSS package.

CALCULATION OF COEFFICIENT OF VARIATION FOR INDIVIDUAL SERIES Date:

Question:

Calculate the coefficient of variation for individual series from the following data:

| Х | 40 | 22 | 9 | 15 | 20 | 17 | 12 | 11 |
|---|----|----|---|----|----|----|----|----|

Aim:

To calculate the coefficient of variation for individual series from the following data using SPSS package.

Formula:

Coefficient of variation = $\frac{\sigma}{\bar{x}} \times 100$

where, $\sigma =$ standard deviation

$$\overline{\mathbf{X}} = \text{mean}$$

| X | \mathbf{X}^2 |
|------------------|---------------------|
| 40 | 1600 |
| 22 | 484 |
| 9 | 81 |
| 15 | 225 |
| 20 | 400 |
| 17 | 289 |
| 12 | 144 |
| 11 | 121 |
| $\Sigma X = 146$ | $\Sigma X^2 = 3344$ |

$$N = 8, \Sigma X = 146$$

$$\overline{X} = \frac{146}{8} = 18.25$$

$$\sigma = \sqrt{\frac{\Sigma X^2}{N} - \left(\frac{\Sigma X}{N}\right)^2}$$

$$= \sqrt{418 - 333.0625}$$

$$= \sqrt{84.9378}$$

$$\sigma = 9.216$$

Coefficient of variation =
$$\frac{\sigma}{\overline{X}}$$
* 100
= $\frac{9.216}{18.25}$ * 100
= $\frac{921.6}{18.25}$
= 50.498



Coefficient of variation
$$= \frac{\sigma}{\overline{X}} * 100$$

$$=\frac{9.852}{18.25}*100$$

= 53.983

Result:

Coefficient of variation is calculated for the given individual series using SPSS package.

Ex. No: 12B

CALCULATION OF COEFFICIENT OF VARIATION FOR DISCRETE SERIES

Date:

Question:

Calculate the coefficient of variation for the discrete series from the following data:

| Marks | 10 | 20 | 30 | 40 | 50 | 60 |
|--------------------|----|----|----|----|----|----|
| Number of students | 8 | 12 | 20 | 10 | 7 | 3 |

Aim:

To calculate the coefficient of variation for discrete series from the following data using SPSS package.

| Marks | 10 | 20 | 30 | 40 | 50 | 60 |
|-----------|----|----|----|----|----|----|
| Number of | 8 | 12 | 20 | 10 | 7 | 3 |
| students | | | | | | |

Formula:

Coefficient of variation
$$= \frac{\sigma}{\overline{X}} * 100$$

| Х | f | $\mathbf{x} = \mathbf{X} \cdot \overline{\mathbf{X}}$ | x ² | fx | fx ² |
|--------|------|---|----------------|--------------------|------------------------|
| 10 | 8 | -25 | 625 | -200 | 5000 |
| 20 | 12 | -15 | 225 | -180 | 2700 |
| 30 | 20 | -5 | 25 | -100 | 500 |
| 40 | 10 | 5 | 25 | 50 | 250 |
| 50 | 7 | 15 | 225 | 105 | 1575 |
| 60 | 3 | 25 | 625 | 75 | 1875 |
| ΣX=210 | N=60 | | | $\Sigma fx = -250$ | $\Sigma f x^2 = 11900$ |

$$\overline{X} = \frac{\Sigma X}{N}$$
$$= \frac{210}{60}$$
$$= 33.07$$

$$\sigma = \sqrt{\frac{\Sigma f X^2}{\Sigma f} - \left(\frac{\Sigma f X}{\Sigma f}\right)^2}$$
$$= \sqrt{\frac{85900}{65} - \left(\frac{2150}{65}\right)^2}$$
$$= \sqrt{1321.53 - 1094.05}$$
$$= \sqrt{227.48}$$
$$\sigma = 15.082$$

Coefficient of variation =
$$\frac{\sigma}{\overline{X}} * 100$$

= $\frac{15.082}{33.07} * 100$
= 45.606



Coefficient of variation = $\frac{\sigma}{\overline{X}} * 100$ = $\frac{13.566}{30.83} * 100$ = 44.00

Result:

Coefficient of variation is calculated for the given individual series using SPSS package.

CALCULATION OF KARL PEARSON'S CORRELATION

Date:

Question:

Calculate the Karl Pearson coefficient of correlation between two variables X and Y from the following data.

| Height of father | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
|------------------|----|----|----|----|----|----|----|
| Height of son | 66 | 67 | 65 | 68 | 70 | 68 | 72 |

Aim:

To calculate the Karl Pearson coefficient of correlation for the following data using SPSS package.

Formula:

$$r = \frac{[\Sigma dx \, dy]}{\sqrt{[\Sigma (dx)^2 * \Sigma (dy)^2]}}$$

| Х | dx | dx ² | Y | dy | dy ² | dx dy |
|----|----|-------------------|----|----|-------------------|-------------------|
| 64 | -3 | 9 | 66 | -2 | 4 | 6 |
| 65 | -2 | 4 | 67 | -1 | 1 | 2 |
| 66 | -1 | 1 | 65 | -3 | 9 | 3 |
| 67 | 0 | 0 | 68 | 0 | 0 | 0 |
| 68 | 1 | 1 | 70 | 2 | 4 | 2 |
| 69 | 2 | 4 | 68 | 0 | 0 | 0 |
| 70 | 3 | 9 | 72 | 4 | 16 | 12 |
| | | $\Sigma(dx)^2=28$ | | | $\Sigma(dy)^2=34$ | $\Sigma dx dy=25$ |

$$r = \frac{[\Sigma dx dy]}{\sqrt{[\Sigma (dx)^2 * \Sigma (dy)^2]}}$$
$$= \frac{25}{\sqrt{28 * 34}}$$
$$= 0.81$$

| | Correlation | ons | |
|---|------------------------|------|------|
| - | | Х | У |
| Х | Pearson Correlation | 1 | .810 |
| | Sig. (2-tailed) | | .027 |
| | Ν | 7 | 7 |
| Y | Pearson Correlation | .810 | 1 |
| | Sig. (2-tailed) | .027 | |
| | Ν | 7 | 7 |

*correlation is significant at the 0.05 level (2 tailed)

Result:

Karl Pearson coefficient of correlation is calculated for the given data using SPSS package.

CALCULATION OF RANK CORRELATION COEFFICIENT

Date:

Question:

Calculate rank correlation coefficient for the following data.

| Price of Tea | 88 | 90 | 95 | 70 | 60 | 75 | 50 |
|-----------------|-----|-----|-----|-----|-----|-----|-----|
| Price of Coffee | 120 | 134 | 150 | 115 | 110 | 140 | 100 |

Aim:

To calculate the rank correlation coefficient for the following data using SPSS package.

Formula:

Rank correlation coefficient = $1 - \frac{6\Sigma D^2}{N^3 - N}$

Where, D = difference between x and y

N = number of observations

| X | Y | RX | RY | D=(RX-RY) | D^2 |
|----|-----|----|----|-----------|------------------|
| 88 | 120 | 3 | 4 | -1 | 1 |
| 90 | 134 | 2 | 3 | -1 | 1 |
| 95 | 150 | 1 | 1 | 0 | 0 |
| 70 | 115 | 5 | 5 | 0 | 0 |
| 60 | 110 | 6 | 6 | 0 | 0 |
| 75 | 140 | 4 | 2 | 2 | 4 |
| 50 | 100 | 7 | 7 | 0 | 0 |
| | | | | | $\Sigma D^2 = 6$ |

Rank correlation coefficient = $1 - \frac{6\Sigma D^2}{N^3 - N}$ = $1 - [6(6^2)/(7^3 - 1)]$ = 1 - (36)/336

= 0.893

| | Correlations | | |
|------------------|----------------------------|--------|--------|
| | | Х | у |
| Spearman's rho x | Correlation Coefficient | 1.000 | .893** |
| | Sig. (2-tailed) | | .007 |
| | Ν | 7 | 7 |
| У | Correlation Coefficient | .893** | 1.000 |
| | Sig. (2-tailed) | .007 | |
| | Ν | 7 | 7 |

**. Correlation is significant at the 0.01 level (2-tailed).

Result:

Spearman's rank correlation coefficient is calculated for the given data using SPSS package.