Q 1) The given data represents the number of absent days and the score obtained by the students

|  |  |
| --- | --- |
| Absent days | score |
| 11 | 35 |
| 4 | 56 |
| 7 | 44 |
| 12 | 30 |
| 3 | 50 |
| 8 | 45 |
| 9 | 44 |

Compute correlation coefficient and its

CORRELATIONS

/VARIABLES=Absent\_days Score

/PRINT=ONETAIL NOSIG

/MISSING=PAIRWISE.

|  |  |  |  |
| --- | --- | --- | --- |
| **Correlations** | | | |
|  | | Absent\_days | Score |
| Absent\_days | Pearson Correlation | 1 | -.925\*\* |
| Sig. (1-tailed) |  | .001 |
| N | 7 | 7 |
| Score | Pearson Correlation | -.925\*\* | 1 |
| Sig. (1-tailed) | .001 |  |
| N | 7 | 7 |
| \*\*. Correlation is significant at the 0.01 level (1-tailed). | | | |

Since r<0 so there is negative co0rrelation between absent days and marks obtained by the student.

Q 2) Compute Karl Pearson’s correlation coefficient

|  |  |
| --- | --- |
| Data (x) | Efficiency |
| 20 | 34 |
| 10 | 56 |
| 30 | 29 |
| 40 | 18 |
| 15 | 50 |
| 24 | 35 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Correlations** | | | |
|  | | Data | Efficiency |
| Data | Pearson Correlation | 1 | -.964\*\* |
| Sig. (1-tailed) |  | .001 |
| N | 6 | 6 |
| Efficiency | Pearson Correlation | -.964\*\* | 1 |
| Sig. (1-tailed) | .001 |  |
| N | 6 | 6 |
| \*\*. Correlation is significant at the 0.01 level (1-tailed). | | | |

Since r<0 so there is negative coorrelation between data andefficiency obtained by the student.

Q 3) The marks obtained by the student in two subjects. Calculate the Spearman’s correlation coefficient.

|  |  |  |
| --- | --- | --- |
| Students | Mathematics | Statistics |
| A | 24 | 39 |
| B | 36 | 52 |
| C | 40 | 60 |
| D | 52 | 65 |
| E | 49 | 62 |
| F | 32 | 40 |
| G | 60 | 80 |

Solution:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Correlations** | | | | |
|  | | | Marks\_Mathematics | Marks\_Statistics |
| Spearman's rho | Marks\_Mathematics | Correlation Coefficient | 1.000 | 1.000\*\* |
| Sig. (1-tailed) | . | . |
| N | 7 | 7 |
| Marks\_Statistics | Correlation Coefficient | 1.000\*\* | 1.000 |
| Sig. (1-tailed) | . | . |
| N | 7 | 7 |
| \*\*. Correlation is significant at the 0.01 level (1-tailed). | | | | |
|  | | | | |

Since r=1 so there is perfect positive correlation between them.

Q 4) from the following table data set compute Rank co-relation coefficient.

|  |  |
| --- | --- |
| X | Y |
| 24 | 15 |
| 40 | 35 |
| 50 | 20 |
| 40 | 28 |
| 16 | 35 |
| 35 | 28 |
| 30 | 40 |

Solution:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Correlations** | | | | |
|  | | | X | Y |
| Spearman's rho | X | Correlation Coefficient | 1.000 | -.220 |
| Sig. (1-tailed) | . | .318 |
| N | 7 | 7 |
| Y | Correlation Coefficient | -.220 | 1.000 |
| Sig. (1-tailed) | .318 | . |
| N | 7 | 7 |

Q 5) The following table represents the income and expenditure of a family.

|  |  |
| --- | --- |
| Income | Expenditure |
| 60 | 35 |
| 45 | 30 |
| 50 | 28 |
| 35 | 26 |
| 30 | 24 |
| 25 | 19 |
| 50 | 32 |
| 28 | 20 |
| 48 | 31 |

* Fit a simple regression equation for expenditure.
* Interpret the meaning of regression coefficient.
* Compute coefficient of determination and standard error of the estimate and also interpret the results.

Solution:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Model Summary** | | | | |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .955a | .913 | .900 | 1.72164 |
| a. Predictors: (Constant), Income | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Coefficientsa** | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| B | Std. Error | Beta |
| 1 | (Constant) | 9.474 | 2.153 |  | 4.400 | .003 |
| Income | .431 | .050 | .955 | 8.553 | .000 |
| a. Dependent Variable: Expenditure | | | | | | |

* Ans : Let the regression equation be Y=a+bX

from coefficient table Y= 9.474+0.43X which is required equation for expenditure.

* Ans : b=0.431 it means if we increase the value of income by 1unit then expenditure also increases by 0.43 unit.
* Ans: Coefficient of determination =0.913 i.e. 91.3% of variation on dependent variable is explained by independent variable.
* Standard error of the estimate (Se)=1.72 i.e. average deviation of observation from the regression line is 1.72

Q 6) A study was done to study the effect of ambient temperature on the electric power consumed by a chemical plant. Following table gives the data which are collected from an experimental pilot plant.

|  |  |
| --- | --- |
| Temperature (F) | Electric power |
| 27 | 250 |
| 45 | 285 |
| 72 | 320 |
| 58 | 295 |
| 31 | 265 |
| 60 | 298 |
| 34 | 267 |
| 74 | 321 |

* Fit a simple regression equation for electric power.
* Interpret the meaning of regression coefficient.
* Compute coefficient of determination and standard error of the estimate and also interpret the results.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Model Summary** | | | | |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .990a | .979 | .976 | 2.87452 |
| a. Predictors: (Constant), Electric\_power | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Coefficientsa** | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| B | Std. Error | Beta |
| 1 | (Constant) | -153.402 | 12.123 |  | -12.654 | .000 |
| Electric\_power | .708 | .042 | .990 | 16.847 | .000 |
| a. Dependent Variable: Temperaure | | | | | | |

* Ans : Let the regression equation be Y=a+bX
* from coefficient table Y= -0.153+0.708X which is required equation for expenditure
* Ans : b=0.153 it means if we increase the value of income by 1unit then expenditure also increases by 0.708 unit.
* Coefficient of determination =0.979 i.e. 97.9% of variation on dependent variable is explained by independent variable.
* Standard error of the estimate (Se)=2.87 i.e. average deviation of observation from the regression line is 2.87