Lab 9

Q1. The following table re

|  |  |
| --- | --- |
| Height | weight |
| 63 | 150 |
| 60 | 148 |
| 70 | 184 |
| 54 | 146 |
| 63 | 155 |
| 52 | 150 |
| 68 | 180 |
| 74 | 185 |
| 72 | 179 |
| 59 | 162 |

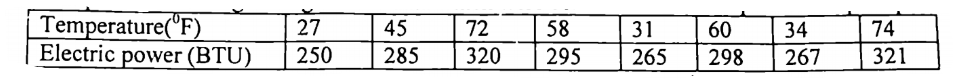
compute the co relation coefficient between height and weight of student and also interpret the result.

Solution:

|  |  |  |
| --- | --- | --- |
|  |  |  |
| Height | weight |  |
| 63 | 150 |  |
| 60 | 148 |  |
| 70 | 184 |  |
| 54 | 146 |  |
| 63 | 155 |  |
| 52 | 150 |  |
| 68 | 180 |  |
| 74 | 185 |  |
| 72 | 179 |  |
| 59 | 162 |  |
|  |  |  |
|  | *Height* | *Weight* |
| Height | 1 |  |
| Weight | 0.87842 | 1 |

Since, r > 0 so there is +Ve co-relation between height and weight of student.

Lab 10

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. 

1. fit a simple regression line, assuming that the relationship between them is linear.
2. Interpret the regression coefficient with reference to your problem.
3. Obtain coefficient of determination, and interpret this.
4. Compute standard error of the estimate and interpret the result.
5. Based on the fitted model in (a), predict the power consumption for an ambient temperature of 650F.

|  |  |
| --- | --- |
| SUMMARY OUTPUT | |
|  |  |
| *Regression Statistics* | |
| Multiple R | 0.989595 |
| R Square | 0.979299 |
| Adjusted R Square | 0.975848 |
| Standard Error | 4.020006 |
| Observations | 8 |

|  |  |  |
| --- | --- | --- |
|  | *Coefficients* | *Standard Error* |
| Intercept | 218.2548 | 4.355954 |
| X Variable 1 | 1.383945 | 0.082146 |

Solution:

1. Let the regression equation be Y = a + b X then from above table required equation be:

Y = 218.25 + 1.38 X

1. Here, b = 1.38 it means if we increase the temp by 1 unit then electric power consumption is increase by 1.38
2. Coefficient of determination = 0.9792 i.e. 97.92% of total variation on electric power consumption is explained by Temperature.
3. Standard error of estimate (Se): 4.02 it means the avg deviation of the observation from the fitted regression line is 4.02.
4. When x = 65,

Then y = 307.95

Lab 11

In a certain type of metal test specimen. the effect of normal stress on a specimen is known to be functionally related to shear resistance. The following table gives the data on the two variables.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Normal stress | 26 | 25 | 28 | 23 | 27 | 23 | 24 | 28 | 26 |
| Shear Stress | 22 | 27 | 24 | 27 | 23 | 25 | 26 | 22 | 21 |

1. Fit a simple regression line, assuming that the relationship between them is linear.
2. Compute co-relation coefficient.
3. Identify which one is response variable, and fit a simple regression line, assuming that the relationship between them is linear.
4. Interpret the regression coefficient with reference to your problem.
5. Obtain the coefficient of determination, and interpret this.
6. Based on the fitted model in (a), predict the shear resistance for normal stress of 30 kilogram per square centimeter.

Lab 12

Q) Time taken by the student to complete a certain programming in min is given below:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 23 | 18 | 30 | 22 | 25 | 30 | 40 | 35 | 38 | 45 |
| 20 | 19 | 23 | 26 | 27 | 28 | 30 | 32 | 35 | 39 |

Compute all mean , median , mode sample standard deviation , sample varience ,

All the descriptive statistical measure are estimated in following table.

|  |  |
| --- | --- |
| *Row1* | |
|  |  |
| Mean | 29.25 |
| Standard Error | 1.696552 |
| Median | 29 |
| Mode | 30 |
| Standard Deviation | 7.587212 |
| Sample Variance | 57.56579 |
| Kurtosis | -0.64664 |
| Skewness | 0.383251 |
| Range | 27 |
| Minimum | 18 |
| Maximum | 45 |
| Sum | 585 |
| Count | 20 |

CV = s/mean\*100 = 25.93%

Lab 13

Q) Marls of two group of student is given below:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Group A | 45 | 76 | 55 | 90 | 75 | 80 | 68 | 80 | 68 |
| Group B | 49 | 65 | 89 | 72 | 44 | 72 | 80 | 59 | 70 |

1. Compute all descriptive statistical measures
2. Interpret the measure of skewness and kurtosis
3. State which group in more consistent and why?

Solution:

|  |  |  |  |
| --- | --- | --- | --- |
|  | *Group A* |  | *Group B* |
|  |  |  |  |
| Mean | 70.77778 | Mean | 66.66667 |
| Standard Error | 4.584932 | Standard Error | 4.760952 |
| Median | 75 | Median | 70 |
| Mode | 80 | Mode | 72 |
| Standard Deviation | 13.7548 | Standard Deviation | 14.28286 |
| Sample Variance | 189.1944 | Sample Variance | 204 |
| Kurtosis | 0.335261 | Kurtosis | -0.40728 |
| Skewness | -0.75412 | Skewness | -0.20765 |
| Range | 45 | Range | 45 |
| Minimum | 45 | Minimum | 44 |
| Maximum | 90 | Maximum | 89 |
| Sum | 637 | Sum | 600 |
| Count | 9 | Count | 9 |

1. All descriptive statistical value ae computed in above table.
2. Coefficient of skewness (SK) = -0.75, so there is negative skewness

Coefficient of kurtosis(K) = 0.33 > 0.263 so the curve is leptokurtic

1. C.V of (A) = S/mean\*100 = 19.43

C.V (B) = s/mean\*100 = 21.42

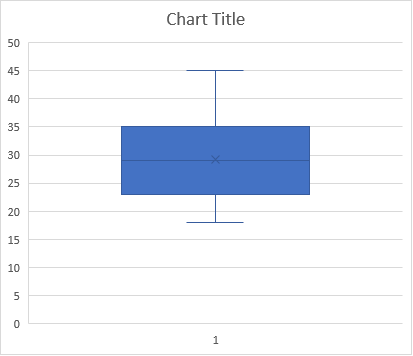
Since CV(B) > CV(A), Hence student of group A is more consistent.

Lab 14

Q) Time taken by the student to complete a certain programming in min is given below:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 23 | 18 | 30 | 22 | 25 | 30 | 40 | 35 | 38 | 45 |
| 20 | 19 | 23 | 26 | 27 | 28 | 30 | 32 | 35 | 39 |

1. Construct box and whisker plot
2. From the box plot answer the following
3. Minimum time taken by top 25% students
4. Highest time of lowest 25 student
5. Limit of time of middle 50% students.



Since, length of upper whisker is greater than length of lower whisker so there is +VE skewness.

1. Since, from above box and whisker plot minimum time occurred of 25% student is 35min
2. From box and whisker plot maximum time of top 25% student is 23min
3. Limit of time of middle 50% student is 23 and 35.