**PRACTICAL: 5**

*Fitting of simple linear regression.*

**FORMULA USED:**

1. **KARL PEARSON’S COEFFICIENT OF CORRELATION :**
2. **REGRESSION COEFFICIENT :**
   1. **MXY:**
   2. **MYX:**
3. **EQUATIONS OF REGRESSION:**
   1. **Y DEPENDS ON X:**
   2. **X DEPENDS ON Y:**

**QUESTION 1:** Find the regression equations to fit the data of the height and weight of the students of your class:

**ANSWER:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HEIGHT(X) | WEIGHT(Y) | XY | X^2 | Y^2 |
| 120 | 45 | 5400 | 14400 | 2025 |
| 118 | 59 | 6962 | 13924 | 3481 |
| 119 | 55 | 6545 | 14161 | 3025 |
| 135 | 50 | 6750 | 18225 | 2500 |
| 110 | 51 | 5610 | 12100 | 2601 |
| 111 | 43 | 4773 | 12321 | 1849 |
| 123 | 47 | 5781 | 15129 | 2209 |
| 124 | 58 | 7192 | 15376 | 3364 |
| 123 | 49 | 6027 | 15129 | 2401 |
| 110 | 47 | 5170 | 12100 | 2209 |
| 119 | 45 | 5355 | 14161 | 2025 |
| 118 | 43 | 5074 | 13924 | 1849 |
| 117 | 54 | 6318 | 13689 | 2916 |
| 123 | 43 | 5289 | 15129 | 1849 |
| 112 | 65 | 7280 | 12544 | 4225 |
| 119 | 45 | 5355 | 14161 | 2025 |
| 111 | 34 | 3774 | 12321 | 1156 |
| 123 | 54 | 6642 | 15129 | 2916 |
| 124 | 45 | 5580 | 15376 | 2025 |
| 110 | 45 | 4950 | 12100 | 2025 |
| 117 | 59 | 6903 | 13689 | 3481 |
| 123 | 50 | 6150 | 15129 | 2500 |
| 112 | 51 | 5712 | 12544 | 2601 |
| 119 | 58 | 6902 | 14161 | 3364 |
| 110 | 49 | 5390 | 12100 | 2401 |
| 117 | 47 | 5499 | 13689 | 2209 |
| 123 | 54 | 6642 | 15129 | 2916 |
| 123 | 45 | 5535 | 15129 | 2025 |
| 124 | 34 | 4216 | 15376 | 1156 |
| 110 | 49 | 5390 | 12100 | 2401 |
| 117 | 47 | 5499 | 13689 | 2209 |
| 123 | 45 | 5535 | 15129 | 2025 |
| 118 | 43 | 5074 | 13924 | 1849 |
| 135 | 54 | 7290 | 18225 | 2916 |
| 110 | 43 | 4730 | 12100 | 1849 |
| 123 | 65 | 7995 | 15129 | 4225 |
| 119 | 45 | 5355 | 14161 | 2025 |
| 123 | 45 | 5535 | 15129 | 2025 |
| 123 | 58 | 7134 | 15129 | 3364 |
| 112 | 54 | 6048 | 12544 | 2916 |
| 123 | 45 | 5535 | 15129 | 2025 |
| 123 | 55 | 6765 | 15129 | 3025 |
| 119 | 50 | 5950 | 14161 | 2500 |
| 110 | 58 | 6380 | 12100 | 3364 |
| 119 | 47 | 5593 | 14161 | 2209 |
| 124 | 43 | 5332 | 15376 | 1849 |
| 110 | 45 | 4950 | 12100 | 2025 |
| 117 | 34 | 3978 | 13689 | 1156 |
| 123 | 51 | 6273 | 15129 | 2601 |
| 117 | 49 | 5733 | 13689 | 2401 |
| 117 | 47 | 5499 | 13689 | 2209 |
| 112 | 34 | 3808 | 12544 | 1156 |
| 126 | 49 | 6174 | 15876 | 2401 |
| 134 | 46 | 6164 | 17956 | 2116 |
| 136 | 56 | 7616 | 18496 | 3136 |
| 118 | 65 | 7670 | 13924 | 4225 |
| 120 | 43 | 5160 | 14400 | 1849 |
| 6798 | **2789** | **332941** | **813152** | **139379** |

**CALCULATIONS:**

X MEAN: 119.2631579

Y MEAN: 48.92982456

X^2 MEAN 14265.82456

Y^2 MEAN 2445.245614

XY MEAN 5841.070175

VAR(X) 42.12373038

SD(X) 6.490279684

VAR(Y) 51.11788243

SD(Y) 7.149677085

COV(X, Y) 5.54478301

r 0.119490868

CORREL(X, Y) 0.119490868

MXY 0.108470515

MYX 0.131630864

Y DEPENDS ON X:

**Y=0.131X+33.23**

X DEPENDS ON Y:

**X=0.108Y+113.978**

**SCATTER PLOT:**

1. **Y DEPENDS ON X:**
2. **X DEPENDS ON Y:**

**INFERENCE:**

We observe that the equation in which x depends on y (**X=0.108Y+113.978**), that is when height depends upon weight is better fitting our data of 57 students as compared to the other equation.

This implies that weight is independent and height is dependent variable.