**Assignment 15**

# Problem Statement 1:

You survey households in your area to find the average rent they are paying. Find the standard deviation from the following data:

**$1550, $1700, $900, $850, $1000, $950.**

**Answer :**

**Using Excel:**

Step1: Find Xi-Mean

Step2: Find (Xi-Mean)2

Step3: Find Sum((Xi-Mean)2

Step4 : Find Sum((Xi-Mean)2)/(n-1)

Step5: Find SQRT(Sum((Xi-Mean)2)/(n-1)) which is standard Deviation.

As per the sample, below is the following :

Average Rent : $1,158.33

Standard Deviation : $367.99

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Xi (Rent) | Xi - Mean | (Xi-Mean)2 |  |  |
| $1,550.00 | $391.67 | $153,402.78 |  |  |
| $1,700.00 | $541.67 | $293,402.78 |  |  |
| $900.00 | -$258.33 | $66,736.11 |  |  |
| $850.00 | -$308.33 | $95,069.44 |  |  |
| $1,000.00 | -$158.33 | $25,069.44 |  |  |
| $950.00 | -$208.33 | $43,402.78 |  |  |
|  |  | $677,083.33 | $135,416.67 | $367.99 |
|  |  |  |  |  |
| Mean | $1,158.33 |  |  |  |
| Sum((Xi-Mean)2) | $677,083.33 |  |  |  |
| Sum((Xi-Mean)2)/(n-1) | $135,416.67 |  |  |  |
| SQRT(Sum((Xi-Mean)2)/(n-1)) | $367.99 |  |  |  |
| Standard Deviation : | $367.99 |  |  |  |

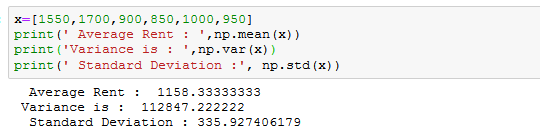
**Using Python:**

x=[1550,1700,900,850,1000,950]

print(' Average Rent : ',np.mean(x))

print('Variance is : ',np.var(x))

print(' Standard Deviation :', np.std(x))



# Problem Statement 2:

Find the variance for the following set of data representing trees in California (heights in

feet):

**3, 21, 98, 203, 17, 9**

**Answer :**

**Using Excel:**

Step1: Find Xi-Mean

Step2: Find (Xi-Mean)2

Step3: Find Sum((Xi-Mean)2

Step4 : Find Sum((Xi-Mean)2)/(n-1) , which is Variance

As per the sample, below is the following :

Mean : 58.5

Variance : 6219.9

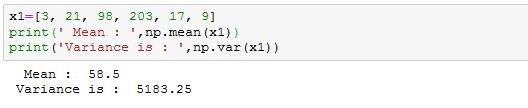
|  |  |  |  |
| --- | --- | --- | --- |
| Xi (Height) | Xi - Mean | (Xi-Mean)2 |  |
| 3 | -55.5 | 3080.25 |  |
| 21 | -37.5 | 1406.25 |  |
| 98 | 39.5 | 1560.25 |  |
| 203 | 144.5 | 20880.25 |  |
| 17 | -41.5 | 1722.25 |  |
| 9 | -49.5 | 2450.25 |  |
|  |  | 31099.5 | 6219.9 |
|  |  |  |  |
| Mean | 58.5 |  |  |
| Sum((Xi-Mean)2) | 31099.5 |  |  |
| Sum((Xi-Mean)2)/(n-1) - **Variance** | 6219.9 |  |  |

**Using Python:**

x1=[3, 21, 98, 203, 17, 9]

print(' Mean : ',np.mean(x1))

print('Variance is : ',np.var(x1))



# Problem Statement 3:

In a class on 100 students, 80 students passed in all subjects, 10 failed in one subject, 7

failed in two subjects and 3 failed in three subjects. Find the probability distribution of

the variable for number of subjects a student from the given class has failed in.

**Answer :**

For a random student,   
  
The probability of failing in 0 subjects, P(X=0) = 0.8  
The probability of failing in 1 subjects, P(X=1) = 0.1  
The probability of failing in 2 subjects, P(X=2) = 0.07  
The probability of failing in 3 subjects, P(X=3) = 0.03  
The probability distribution can be shown as:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| X | 0 | 1 | 2 | 3 |
| P(X) | 0.8 | 0.1 | 0.07 | 0.03 |