**Session 15**

**Assignment 1 Question**

**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.**

**Solution:**

**A : Calculate Mean**

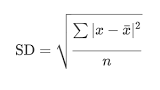
Mean = ( Σ xi ) / n

Σ of xi = $1550 + $1700 + $900 + $850 + $1000 + $950 = $1158.33

6

The Mean is $1158.33

**B : Calculate Standard Deviation**

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**Where :**

SD = Standard Deviation

 = each value in the data set

 = Mean is the data set

n = number of values in the data set

**Step 1 : Calculate mean**

Σ of xi = $1550 + $1700 + $900 + $850 + $1000 + $950 = $1158.33

**Step 2 : Subtract the mean calculated from step 1 from each value. This gives you the differences:**

$1550 – $1158.33 = $391.67

$1700 – $1158.33 = $541.67

$900 – $1158.33 = -$258.33

$850 – $1158.33 = -$308.33

$1000 – $1158.33 = $158.33

$950 – $1158.33 = $208.33

**Step 3: Square the differences you found in Step 3:**

$391.672 = 153405.3889

$541.672 = 293406.3889

-$258.332 = 66734.3889

-$308.332 = 95067.3889

$158.332 = 25068.3889

$208.332 = 43401.3889

**Step 4: Add up all of the squares you found in Step 3 and divide by 5 (which is 6 – 1):**

(153405.3889 + 293406.3889 + 66734.3889 + 95067.3889 + 25068.3889 + 43401.3889) / 5 = 135416.66668

**Step 5: Find the square root of the number you found in Step 4 (the** [**variance**](https://www.statisticshowto.datasciencecentral.com/probability-and-statistics/variance/)**):**

√135416.66668 = 367.99

**The standard deviation is 367.99.**

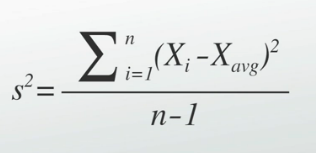
**Problem Statement 2:**

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

**feet):**

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

**Variance Formula:**



**Step 1: Add up the numbers in your given data set.**

3 + 21 + 98 + 203 + 17 + 9 = 351

**Step 2: Square your answer:**

351 × 351 = 123,201

**…and divide by the number of items. We have 6 items in our example so:**

123,201 / 6 = 20,533.5

**Step 3: Square each item in the data set & get the sum of squares**

3 × 3 + 21 × 21 + 98 × 98 + 203 × 203 + 17 × 17 + 9 × 9

**Add those numbers (the squares) together:**

9 + 441 + 9604 + 41209 + 289 + 81 = 51,633

**Step 4: Subtract the value calculated in Step 2 from the the value of Step 3.**

51,633 – 20,533.5 = 31,099.5

**Step 5: Subtract 1 from the number of items in your data set\*. For our example:**

6 – 1 = 5

**Step 6: Divide the number in Step 4 by the number in Step 5. This gives you the variance:**

31,099.5 / 5 = 6,219.9

**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.**

**Solution:**

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** |