Assignment: Session 15

**2. Problem Statement**

**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.**

**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**

**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.

**Note: Solution submitted via github must contain all the detailed steps.**

**3. Output**

**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**

**OUTPUT:**

Step 1: Find the mean:

($1550 + $1700 + $900 + $850 + $1000 + $950)/6 = $1158.33

Step 2: Subtract the mean 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):

√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**

**OUTPUT**

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

Set this number aside for a moment.

Step 3: Take your set of original numbers from Step 1, and square them individually this time:

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 amount in Step 2 from the amount in Step 3.

51,633 – 20,533.5 = 31,099.5

Set this number aside for a moment.

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.

**OUTPUT**

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 |

**The OUTPUT of the problem statements 1 and 2 are verified in python:**

