**Task 1:**

**1. You survey households in your area to find the average rent they are paying. Find the**

**standard deviation from the following data:**

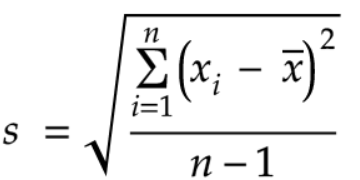
**$1550, $1700, $900, $850, $1000, $950.**

**Solution:**

The given data are $1550, $1700, $900, $850, $1000, $950.

The mean of the above data is 1158.333.

Now, we find the distance from each data point to the mean and square each of those distances. Then find the variance and standard deviation.



|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | X |  |  |  |  |  |
|  | 1550 | 391.6667 | 153402.8 |  | Mean | 1158.333 |
|  | 1700 | 541.6667 | 293402.8 |  | Variance | 135416.7 |
|  | 900 | -258.333 | 66736.11 |  | Standard Deviation | 367.99 |
|  | 850 | -308.333 | 95069.44 |  |  |  |
|  | 1000 | -158.333 | 25069.44 |  |  |  |
|  | 950 | -208.333 | 43402.78 |  |  |  |
| Total | 6950 |  | 677083.3 |  |  |  |

Therefore, the standard deviation is 367.99.

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

**feet):**

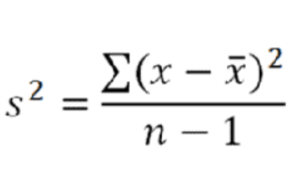
**3, 21, 98, 203, 17, 9**

**Solution:**

The given data are 3, 21, 98, 203, 17, 9.

The mean of the above data is 58.5.

Now, we find the distance from each data point to the mean and square each of those distances. Then find the variance.



|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | X |  |  |  |  |  |
|  | 3 | -55.5 | 3080.25 |  | Mean | 58.5 |
|  | 21 | -37.5 | 1406.25 |  | Variance | 6219.9 |
|  | 98 | 39.5 | 1560.25 |  | Standard Deviation | 78.86634 |
|  | 203 | 144.5 | 20880.25 |  |  |  |
|  | 17 | -41.5 | 1722.25 |  |  |  |
|  | 9 | -49.5 | 2450.25 |  |  |  |
| Total | 351 |  | 31099.5 |  |  |  |

Therefore, the variance is 6219.9.

**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) =80/100 =0.8.  
The probability of failing in 1 subjects, P(X=1) =10/100 = 0.1.  
The probability of failing in 2 subjects, P(X=2) =7/100 = 0.07.  
The probability of failing in 3 subjects, P(X=3) = 3/100 = 0.03.

The probability distribution can be shown as:

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

**Task 2:**

**1. A test is conducted which is consisting of 20 MCQs (multiple choices questions) with every**

**MCQ having its four options out of which only one is correct. Determine the probability that a**

**person undertaking that test has answered exactly 5 questions wrong.**

**Solution:**

Here, n = 20, n - k = 5, k = 20 - 5 = 15.

Here the probability of success = probability of giving a right answer = s =  .

Hence, the probability of failure = probability of giving a wrong answer = 1 - s

= .

When we substitute these values in the formula for Binomial distribution we get,

So, P (exactly 5 out of 20 answers incorrect) = C (20, 5) \* \*

P (5 out of 20) = (20∗19∗18∗17∗16)/(5∗4∗3∗2∗1) \*  \*

= 0.0000034 (approximately)

Thus, the required probability is 0.0000034 approximately.

**2. A die marked A to E is rolled 50 times. Find the probability of getting a “D” exactly 5 times.**

**Solution:**

Here, n = 50, k = 5, n - k = 45.

The probability of success = probability of getting a “D”= s =  .

Hence, the probability of failure = probability of not getting a “D” = 1 - s = .

**3. Two balls are drawn at random in succession without replacement from an urn containing 4 red balls and 6 black balls.**

**Find the probabilities of all the possible outcomes.**

**Solution:**

Here, total outcome is 10.

Therefore, probability of getting red ball = 4/10=2/5 and probability of getting black ball = 6/10 = 3/5.