**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:**

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There are total 6 sample data.

To calculate the average or the mean of the above data, we use the formula:

The Mean of the above data is **1158.33**

To calculate the variance we use the formula:

The Variance is **135416.67**

To calculate the Standard Deviation we use the formula:

**Or**

**367.99**

The standard Deviation of the above data is **367.99**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Data (X)** | **X - ** | **(X - )²** |
| **X1** | 1550 | 391.67 | 153402.78 |
| **X2** | 1700 | 541.67 | 293402.78 |
| **X3** | 900 | -258.33 | 66736.11 |
| **X4** | 850 | -308.33 | 95069.44 |
| **X5** | 1000 | -158.33 | 25069.44 |
| **X6** | 950 | -208.33 | 43402.78 |
| **Sum** | **6950** |  | **677083.33** |
| **n** | **6** | | |
| **Mean ()** | **1158.33** | | |
| **Variance ()** | **135416.67** | | |
| **Standard Deviation ()** | **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:**

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There are total 6 data. Therefore

To calculate the average or the mean of the above data, we use the formula:

The Mean of the above data is **58.50**

To calculate the variance we use the formula:

The Variance is **6219.90**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Data (X)** | **X - ** | **(X - )²** |
| **X1** | 3 | -55.50 | 3080.25 |
| **X2** | 21 | -37.50 | 1406.25 |
| **X3** | 98 | 39.50 | 1560.25 |
| **X4** | 203 | 144.50 | 20880.25 |
| **X5** | 17 | -41.50 | 1722.25 |
| **X6** | 9 | -49.50 | 2450.25 |
| **Sum** | **351** |  | **31099.50** |
| **n** | **6** | | |
| **Mean ()** | **58.50** | | |
| **Variance ()** | **6219.90** | | |

**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:**

The probability of failing in 0 subjects,

The probability of failing in 1 subject,

The probability of failing in 2 subjects,

The probability of failing in 3 subjects,

**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:**

Total number of questions

Number of wrong answers

Number of correct answers

Probability of wrong answer

Probability of correct answer

The binomial distribution formula is:

On substituting the values to the formula

The probability is

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

**Solution:**

Total number of trials

Count of success

Count of failure

Probability of getting a D:

Probability of not getting a D:

The binomial distribution formula is:

On substituting the values to the formula

The probability is

**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:**

Red balls:

Black balls:

Total balls:

The probabilities of all possible outcomes are:

Probability of drawing both red balls:

Probability of drawing 1 red ball & 1 black ball:

Probability of drawing 1 black ball & 1 red ball:

Probability of drawing both black balls: