**Assignment - 9**

**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:**

**Formula of Mean:**

**Calculation of Mean:**

The values of = 1550, =1700, =900, =850, =1000 & =950

The number of elements, =6

=

=

**Formula of Variance:**

**Calculation of Variance:**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| 1 | 1550 | 391.67 | 153405.38 |
| 2 | 1700 | 541.67 | 293406.38 |
| 3 | 900 | -258.33 | 66734.38 |
| 4 | 850 | -308.33 | 95067.38 |
| 5 | 1000 | -158.33 | 25068.38 |
| 6 | 950 | -208.33 | 43401.38 |
| **Sum** | 6950 |  | 677083.28 |
| **Mean ()** | 1158.33 | | |
| **N** | 6 | | |

**Variance ()** =

**Variance ()** =

**Formula of Standard Deviation:**

**Calculation of Standard Deviation:**

**Standard Deviation () =**

**Standard Deviation () =**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| 1 | 1550 | 391.67 | 153405.38 |
| 2 | 1700 | 541.67 | 293406.38 |
| 3 | 900 | -258.33 | 66734.38 |
| 4 | 850 | -308.33 | 95067.38 |
| 5 | 1000 | -158.33 | 25068.38 |
| 6 | 950 | -208.33 | 43401.38 |
| **Sum** | 6950 |  | 677083.28 |
| **Mean ()** | 1158.33 | | |
| **N** | 6 | | |
| **Variance ()** | 135416.65 | | |
| **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:**

**Formula of Mean:**

**Calculation of Mean:**

The values of = 3, =21, =98, =203, =17 & =9

The number of elements, =6

=

=

**Formula of Variance:**

**Calculation of Variance:**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| 1 | 3 | -55.5 | 3080.25 |
| 2 | 21 | -37.5 | 1406.25 |
| 3 | 98 | 39.5 | 1560.25 |
| 4 | 203 | 144.5 | 20880.25 |
| 5 | 17 | -41.5 | 1722.25 |
| 6 | 9 | -49.5 | 2450.25 |
| **Sum** | 351 |  | 31099.5 |
| **Mean ()** | 58.5 | | |
| **N** | 6 | | |
| **Variance ()** | 6219.9 | | |

**Variance ()** =

**Variance ()** =

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 subjects,   
The probability of failing in 2 subjects,   
The probability of failing in 3 subjects,

The probability distribution can be shown as:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 0 | 1 | 2 | 3 |
|  | 0.8 | 0.1 | 0.07 | 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, No of Trials = = 20

Count of success = = 5,

Count of getting a wrong answer = = = 15.

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

Hence, the probability of failure = probability of giving a wrong answer= = =  =

**Formula of Binomial Distribution:**

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

=

Thus, the required probability is approximately.

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

**Solution:**

Here, No of Trials = = 50

Count of success = = 5,

Count of getting a wrong answer = = = 45

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

Hence, the probability of failure = probability of not getting a “D” = = =  =

**Formula of Binomial Distribution:**

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

Thus, the required probability is approximately.

3. Two balls are drawn at random in succession without replacement from an urn containing 4

red balls and 6 black balls.

**Solution:**

Find the probabilities of all the possible outcomes.

Red balls (R) = 4 Black balls (B) = 6 Total balls (T) = 10

Total ways to draw 2 balls == 90 ways

Ways to draw both red balls (RR) ==12 ways

Ways to draw 1 red and 1 black ball (RB) = = 24 ways

Ways to draw 1 black and 1 red ball (BR) = = 24 ways

Ways to draw both black balls (BB) = = 30 ways

**The probability of all possible outcomes is:**

Probability of drawing both red balls (RR) = = = =

Probability of drawing 1 red & 1 black ball (RB) = = = =

Probability of drawing 1 black & 1 red ball (BR) = = = =

Probability of drawing both black balls (BB) = = = =