Task 1

① you Survey households in your area to find the average rent they are playing. Find the Standard deviation from the following data.

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

Sol: Mean = $\frac{\Sigma x}{N}$

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

$= \frac{\$6,950}{6} = \$1158 \cdot 33$

Variance = $\frac{\Sigma(x - \mu)^2}{N-1}$

According to the formula of variance

$(x - \mu)$

1: $1550 - 1158 \cdot 33 = 391.67$

2: $1700 - 1158 \cdot 33 = 541 \cdot 67$

3: $900 - 1158 \cdot 33 = -258 \cdot 33$

4: $850 - 1158 \cdot 33 = -308 \cdot 33$

5: $1000 - 1158 \cdot 3 = 158 \cdot 33$

6: $950 - 1158 \cdot 3 = 208 \cdot 33$

$(x - \mu)^2$

$(391 \cdot 67)^2 = 153405 \cdot 3889$

$(541 \cdot 67)^2 = 293406 \cdot 3889$

$(-258 \cdot 33)^2 = 66734 \cdot 3889$

$(-308 \cdot 33)^2 = 95067 \cdot 3889$

$(158 \cdot 33)^2 = 25068 \cdot 3889$

$(208 \cdot 33)^2 = 43401 \cdot 3889$

$$\frac{\sum (x - \mu)^2}{N-1}$$

$$\left(153405 \cdot 3889 + 293406 \cdot 3889 + 66734 \cdot 3889 + 95067 \cdot 3889 + 25068 \cdot 3889 + 43401 \cdot 3889\right) \Big/ (6-1)$$

$$= 135416 \cdot 66668$$

Standard Deviation

$$\sqrt{\sum \frac{(x - \mu)^2}{N-1}}$$

$$= \sqrt{135416 \cdot 66668}$$

$$= 367 \cdot 99$$

2. Find the Varience for the following set of data representing trees in California (heights in feet)

3, 21, 98, 203, 17, 9.

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

$(351)^2 = 123201$

$123201 / 6 = 20,533.5$

$$Variance = \sum \frac{(x - \mu)^2}{N-1}$$

$$= \frac{3 \times 3 + 21 \times 21 + 98 \times 98 + 203 \times 203 + 17 \times 17 + 9 \times 9}{}$$

$= 9 + 441 + 9604 + 41209 + 289 + 81$

$= 51633$

$51633 - 20,533 \cdot 5$

$= 31099 \cdot 5$

$= 31099 \cdot 5 / 5 = 6219.9$

3. In a class on 100 Students, 80 Students Passed in all Subjects, 10 failed in one Subject, 7 failed in 2 Subjects and 3 failed in 3 Subjects. Find the Probability distribution of the variable for no of Subjects a Subject from the given Class has failed in.

The Probability of failing in 0 Subjects

$$P(x=0) = \frac{80}{100} = 0.8$$

The Probability of failing in 1 Subjects

$$P(x=1) \frac{10}{100} = 0.1$$

The Probability of failing in 2 Subjects

$$P(x=2) = \frac{7}{100} = 0.07$$

The Probability of failing in 3 Subjects

$$P(x=3) = \frac{3}{100} = 0.03.$$

Total Probability $= 0.8 + 0.1 + 0.07 + 0.03$

$$= 1.$$

Task 2

1. A test conducted which is consisting of 20 McQs 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.

Sol: $n = 20$ $n-k=5$ $k = 20-5 = 15$.

Probability of Success $(P) = 1/4$

Probability of failure $1-P$

$$q = 1 - 1/4 = 3/4.$$

Binomial distribution

$$P(x=r) = \binom{n}{r} P^r q^{n-r}$$

P[5 out of 20] $C(20 , 5) * (1/4)^{15} (3/4)^{20-15}$

$$= \frac{20 \times 19 \times 18 \times 17 \times 16}{5 \times 4 \times 3 \times 2 \times 1} \, r(1/4)^{15}(3/4)^{5}$$

$$= 0.0000034.$$

2. A die marked A to E is rolled 50 times.
Find Probability of getting a 'D' exactly
5 times.

Sol: $n = 50$ $K = 5$ $n - K = 45$.

The Probability of Success(P) $\frac{1}{5}$

"   "   "   failure $= 1 - P$

$$= 1 - \frac{1}{5}$$

$$= \frac{4}{5}$$

3. Two balls are drawn at Random is Succession
without replacement from an urn Containing
4 redballs and 6 black balls.
Find the Probabilities of all possible of.
outcomes.

Sol: Possible ways

RBB $= 4C_1 \, 6C_1 \, 5C_1$

BRB $= 6C_1 \, 4C_1 \, 5C_1$

BBR $= 6C_1 \, 5C_1 \, 4C_1$

no of ways $= 3$
Total Probabilities $= 10C_3$ ways

$$\frac{6 \times 5 \times 4 \times 3}{10C_3} = \frac{6 \times 8 \times 4 \times 3!}{10 \times 9 \times 8}$$

$$= \frac{1}{2}.$$