

## P&S Mid and Assignment Questions

1. For the discrete probability distribution

X	0	1	2	3	4	5	6
P(X)	0	2k	2k	3k	k <sup>2</sup>	2k <sup>2</sup>	7k <sup>2</sup> +k

Find (i) k (ii) mean (iii) Variance

2. Two dice are thrown. Let X assign to each point

(a, b) in S the maximum of its numbers i.e.,  $X(a, b) = \max(a, b)$ . Find the probability distribution.

X is a random variable with  $X(S) = \{1, 2, 3, 4, 5, 6\}$ .

Also find the mean and variance of the distribution

3. Out of 800 families with 5 children each, how many would you expect to have

(a) 3 boys (b) 5 girls (c) either 2 or 3 boys

(d) atleast one boy. Assume equal probabilities for boys & girls.

4. Find mean and variance of P.D

5. If X is a poisson variate such that  $2P(X=0) = P(X=2)$

find (i)  $P(X \leq 3)$  (ii)  $P(2 < X \leq 5)$  (iii)  $P(X \geq 3)$ .

6. A continuous random variable has the probability density function

$$f(x) = \begin{cases} kx e^{-\lambda x} & \text{for } x \geq 0, \lambda > 0 \\ 0, & \text{otherwise} \end{cases}$$

Determine (i) k (ii) Mean (iii) Variance

7. A Continuous random variable X has the distribution function

$$F(x) = \begin{cases} 0 & \text{if } x \leq 1 \\ k(x-1)^4 & \text{if } 1 < x \leq 3 \\ 1 & \text{if } x > 3 \end{cases}$$

Determine (i) f(x) (ii) k (iii) Mean.

8. If X is a continuous random variable and  $Y = aX + b$

P.T  $E(Y) = aE(X) + b$  and  $V(Y) = a^2 V(X)$ .

9. A population consists of five numbers 2, 3, 6, 8, 11. Consider all possible samples of size two which can be drawn with replacement from this population. Find

(a)  $\mu$  (b)  $\sigma$  (c)  $\mu_{\bar{x}}$  (d)  $\sigma_{\bar{x}}$

10. Let  $S = \{1, 5, 6, 8\}$  find the probability distribution of the sample mean for sample of size 2 drawn without replacement. Find

(a)  $\mu$  (b)  $\sigma$  (c)  $\mu_{\bar{x}}$  (d)  $\sigma_{\bar{x}}$

11. The mean and S.D of a population are 11795 and 14054 respectively. If  $n=50$  find 95% C.I for the mean.

12. Find 95% confidence limits for the mean of a normality distributed population from which the following sample was taken

15, 17, 10, 18, 16, 9, 7, 11, 13, 14.