

Two dice are thrown. Let X assign to each point (a, b) is 5 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

A random variable X has the following probability function

$X=x$	1	2	3	4	5	6	7	8
$P(X=x)$	K	$2K$	$3K$	$4K$	$5K$	$6K$	$7K$	$8K$

Find the value of k and (i) Mean (ii) Variance (iii) $P(2 \leq x \leq 5)$

If the probability density of a random variable is given by

$$f(x) = \begin{cases} kx^2 e^{-x} & \text{for } x \geq 0 \\ 0 & \text{otherwise} \end{cases}$$

i) Find the value of k ii) mean and variance of the variable

If the probability density of a random variable is given by

$$f(x) = \begin{cases} k(1 - x^2), & \text{for } 0 < x < 1 \\ 0, & \text{otherwise} \end{cases}$$

Find the value of k and the probabilities that a random variable having this probability density will take on a value (i) between 0.1 and 0.2 (ii) greater than 0.5.

Out of 800 families with 4 children each, how many families would be expected to have (a) 2 boys and 2 girls (b) at least one boy (c) no girl (d) at most 2 girls? Assume equal probabilities for boys and girls

a) As only 3 students came to attend the class today, find the probability for exactly 4 students to attend the classes tomorrow.

b) If x is poisson variates such that $p(x=0) = p(x=1)$ and using recurrence relation formula find the probabilities at $x=1, 2, 3, 4, 5$

a) If x is normal variate with mean 30 and standard deviation with 5. find the probabilities (i) $26 \leq x \leq 40$ (ii) $x \geq 45$

b) A sales tax has reported that the average sales of the 500 business that has deal during with a year 36,000 with standard deviation 10,000

Assuming that the sales in these distributed in normal distribution

Find (i) The number of business as sales which RS 40,000

(ii) the percentage of business sales of which are likely range between

RS 30,000 and RS 40,000

In a Normal distribution, 7% of the items are under 35 and 89% are under 63. Determine the mean and variance of the distribution

Show that the sample variance of a sample drawn from population given by the expression

the $S^2 = \frac{1}{n-1} \sum_{i=1}^n (x_i - \bar{x})^2$ is an unbiased estimator of the population variance

Let $x_1, x_2, x_3, \dots, x_n$ is a random sample taken from a population with probability density function

$$f(x) = \theta x^{\theta-1}, 0 < x < 1, \theta > 0. \text{ Find a sufficient estimator for } \theta.$$

Describe the method of maximum likelihood estimation.

In a watch repair shop, the service time in minutes is 14, 17, 27, 18, 12, 8, 22, 13, 19 and 12. Give a maximum likelihood estimate of mean service time with the assumption that the service time follows an exponential distribution with parameter λ .

A simple random sample of size n is taken from the probability density function

$$f(x) = 2\theta x e^{-\theta x^2}, x > 0, \theta > 0 \text{ is an unknown parameter.}$$

Calculate the estimator of θ by the method of moments.

Explain the method of moment's estimation.

Let $x_1, x_2, x_3, \dots, x_n$ be a random sample from the discrete distribution

$$P(X_1=1) = (2(1-\theta))/(2-\theta), P(X_2=2) = \theta/(2-\theta), \text{ where } \theta \in (0,1) \text{ is unknown.}$$

Find the estimator θ by the method of moments

A training data set of 9 different values for mid semester (say x) and end semester (say y) values are given by

X	10	7	3	16	9	11	7	10	8
Y	42	39	32	50	44	55	43	37	43

Assuming a linear relationship $y \propto x$. Estimate the parameters by the method of least squares

Past experiences shown the following result of productivity per hectare with respective use of fertilizers and seeds. Assuming the linear relationship of y on x_1, x_2 . Estimate the parameter from the given data

Fertilizer x_1	45	30	70	75	65	80
Seeds x_2	2	18	3	2.5	2	3
Productivity y	2000	2100	1800	1900	2400	2500