RPNS Assignment → 1

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Before 10-12-2016.

Q1 Suppose a random Variable X takes on the Values -4, 2, 3, 7 with respective probabilities

$$\frac{k+2}{10}, \frac{2k-3}{10}, \frac{3k-4}{10}, \frac{k+1}{10}$$

Find the distribution and expected value of X.

(QNo.2) A Coin, weighted so that $P(H) = 1/3$ and $P(T) = 2/3$ is tossed unfill 1 head or 5 tails occur. Find the expected no. E of tosses of the Coin.

QNo3 A Player tosses 2 fair coins. The player wins $3 if 2 head occur and $1 if 1 head occurs. For the game to be fair, how much should the player lose if no heads occur.

QNo4 A box Contains 10 transistors of which 2 are defective. A transistor is selected from the box and tested until a non-defective one is choosen. Find the expected no. E of transistors to be choosen.

ONO.5 Find the mean μ, variance σ^2 and standard deviation σ of each distribution.

(a)

x	2	3	8
f(x)	1/4	1/2	1/4

(b)

x	-2	-1	7
f(x)	1/3	1/2	1/16

ONO.6 Two Cards are selected from a box which contains 5 cards numbered 1, 1, 2, 2 and 3 let X denote the sum and the Y the maximu of the 2 no.'s drawn. Find the distribution, mea variance and standard deviation of the random variables. (a) X, (b) Y, (c) Z = X+Y (d) = W = XY

ONO7 Suppose X & Y are independent random variables with the following respective distributi

x	1	2
g(x)	0.7	0.3

y	-2	5	8
h(y)	0.3	0.5	0.2

Find the joint distribution f of X and Y and Varify the Cov(X, Y) = 0.

Q No.8 Find the density function $f(x)$ of the continuous random variable X whose cumulative distribution function F follows.

(a) $$F(x) = \begin{cases} 0 & \text{if } x < 0 \\ x^5 & \text{if } 0 \le x \le 1 \\ 1 & \text{if } x > 1 \end{cases}$$

(b) $$F(x) = \begin{cases} 0 & \text{if } x < 0 \\ \sin x, & \text{if } 0 \le x \le \pi/2 \\ 1 & \text{if } x > \pi/2 \end{cases}$$

Q No.9 :→ Compute $P(k)$ for the binomial distribution $B(n,p)$ where

(a) $n = 5, p = 1/3, k = 2$, (b) $n = 10, p = 1/2, k = 7$.

Q No.10 Consider the binomial distribution $B(n,p)$

Show that (a) $\dfrac{P(k)}{P(k-1)} = \dfrac{(n-k+1)p}{kq}$.

(b) $P(k-1) < P(k)$ for $k < (n+1)p$

and $P(k-1) > P(k)$ for $k > (n+1)p$.