



COLLEGE OF ENGINEERING & TECHNOLOGY

Department : Electronics & Communications Engineering

Lecturer : Prof. Mohamed Essam Khedr

GTA : Eng. Hatem Abou-zeid

Course : Communication Systems II

Course Code : EC 421

Sheet (4)- Mean, Variance & Multiple Random Variables

1- Let $Y = A \cos(wt) + c$, where A has mean m and variance σ^2 , and w and c are constants. Find the mean and variance of Y .

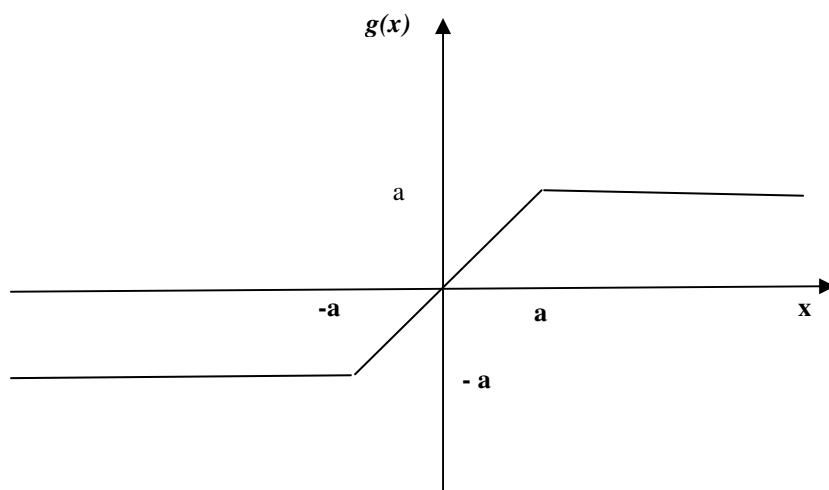
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a. Suppose a coin is tossed n times. Each coin toss costs d dollars and the reward in obtaining X heads is $aX^2 + bX$. Find the expected value of the net reward.

b. Suppose that the reward in obtaining X heads is a^x , where $a > 0$. Find the expected value of the reward.

3- Let $g(X) = b a^x$, where a and b are positive constants and X is a poisson random variable. Find $E[g(X)]$.

4- Find the mean and variance of the limiter shown below



5- Let the random variables X , Y , and Z be independent continuous random variables. Find the following probabilities in terms of $F(x)$, $F(y)$ and $F(z)$

a. $P[|X| < 5, Y > 2, Z^2 \geq 2]$

b. $P\{ X > 5, Y < 0, Z = 1 \}$

c. $P[\min(X, Y, Z) > 2]$

d. $P[\max(X, Y, Z) < 6]$

6- The random vector (X, Y) is uniformly distributed (i.e. $f(x,y)=k$) inside the regions shown below and zero elsewhere.

a. Find the value of K in each case

b. Find the marginal pdf for X and Y in each case.

c. Are X and Y independent?

