

Philadelphia University
Department of Basic Sciences and Mathematics

Second Exam

Probability Theory

22-12-2015

Name: _____ Number: _____ Serial: _____ Section: (1)

1. If X has the distribution function $F(x) = \begin{cases} 0 & : x < 0 \\ 1/8 & : 0 \leq x < 1 \\ 1/2 & : 1 \leq x < 2 \\ 7/8 & : 2 \leq x < 3 \\ 1 & : x \geq 3 \end{cases}$, find

(a) (2 points) $P(1 < X \leq 3)$,

(b) (2 points) the distribution of X .

2. The p.d.f of the random variable X is given by $f(x) = \begin{cases} \frac{c}{\sqrt{x}} & : 0 < x < 4 \\ 0 & : \text{otherwise} \end{cases}$, find

(a) (2 points) the value of c ,

(b) (2 points) $P(X > 1)$.

3. If the values of the joint distribution of X and Y are as shown in the table.

		x			
		0	1	2	
y	0	1/12	1/6	1/24	7/24
	1	1/4	1/4	1/40	21/40
	2	1/8	1/20		7/40
	3	1/120			1/120
		7/15	7/15	1/15	

Find:

(a) (2 points) $P(X > Y)$,

(b) (2 points) the conditional distribution of Y given that $X = 1$.

4. If the joint probability distribution of X and Y is given by

$$f(x,y)=\begin{cases} 6(1-y) & : 0\leq x\leq y\leq 1 \\ 0 & : \text{otherwise} \end{cases},$$

find

(a) (4 points) $P\left(X + Y < \frac{1}{2}\right)$,

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(b) (4 points) $E(X)$.

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