

Principles of Probability

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Grade	8.00 out of 10.00 (80%)

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FINISH REVIEW

Question 1
 Partially correct
 Mark 8.00 out of 10.00
 Flag question

A bank operates both a drive-up facility and a walk-up window. On a randomly selected day, let X = the proportion of time that the drive-up facility is in use (at least one customer is being served or waiting to be served) and Y = the proportion of time that the walk-up window is in use. Then the set of possible values for (X, Y) is the rectangular $R = (x, y) : 0 \leq x \leq 1, 0 \leq y \leq 1$. Suppose the joint pdf of (X, Y) is given by

$$f_{X,Y}(x, y) = \begin{cases} k(x^2 + y^2) & 0 \leq x \leq 1; 0 \leq y \leq 1 \\ 0 & \text{otherwise} \end{cases}$$

a) The value of the constant k that makes $f_{X,Y}(x, y)$ an indeed a joint pdf is

3/2

Write your answer as decimal rounded to four decimal places.

b) Find the $P(0 \leq X \leq \frac{1}{2}, 0 \leq Y \leq \frac{1}{2})$

0.0301

c) The marginal pdf of X is given by

$$f_X(x) = \begin{cases} -\frac{3}{2}x^2 + \frac{1}{2} & 0 \leq x \leq 1 \\ 0 & \text{otherwise} \end{cases}$$

False

Write your answer as decimal rounded to four decimal places.

d) Find the $P(0.25 \leq X \leq 0.75)$

0.4531

e) Are X and Y dependent random variables

No



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