

EE 315-Winter 2014(132)
QZ4

Sec	Ser	ID	Name KEY
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Let random variables X and Y have the joint density function

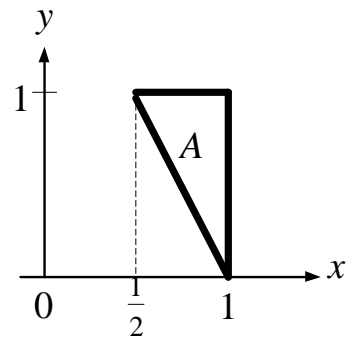
$$f_{XY}(x, y) = \begin{cases} 4xy & 0 < x < 1 \quad 0 < y < 1 \\ 0 & \text{otherwise} \end{cases}$$

- (a) Find the marginal densities $f_X(x)$ and $f_Y(y)$?
 (b) Are X and Y independent, *Explain* ?
 (c) Find the $P(A)$?

Solution

$$(a) f_X(x) = \int_{-\infty}^{\infty} f_{XY}(x, y) dy = \int_0^1 4xy dy = 2x \quad 0 < x < 1$$

$$f_Y(y) = \int_{-\infty}^{\infty} f_{XY}(x, y) dx = \int_0^1 4xy dx = 2y \quad 0 < y < 1$$



(b) Since $f_{XY}(x, y) = f_X(x)f_Y(y) \Rightarrow X, Y$ are independent

$$(c) P(A) = \int_{x=\frac{1}{2}}^{x=1} \int_{y=2-2x}^{y=1} 4xy \, dy dx = \frac{13}{24} = 0.541$$

OR

$$P(A) = \int_{y=0}^{y=1} \int_{x=\frac{2-y}{2}}^{x=1} 4xy \, dx dy = \frac{13}{24} = 0.541$$