MITx: 6.041x Introduction to Probability - The Science of Uncertainty

Exercise: Definition of independence

(1/1 point)

Suppose that X and Y are independent, with a joint PDF that is uniform on a certain set S: $f_{X,Y}(x,y)$ is constant on S, and zero otherwise. The set S

- must be a square.
- must be a set of the form $\{(x,y) : x \in A,\ y \in B\}$ (known as the Cartesian product of two sets A and B). ✔
- can be any set.

Answer:
Let A be the set of all x on which $f_X(x)$ is positive and let B be the set of all y on which $f_Y(y)$ is positive. Then, the set S, on which $f_{X,Y}(x,y) = f_X(x)f_Y(y) > 0$, will be the Cartesian product of A with B; it is not necessarily a square, but it cannot be an arbitrary set.

You have used 2 of 2 submissions