STAT/MA 41600
Practice Problems: October 20, 2014

1. Consider a pair of random variables X, Y with constant joint density on the triangle with vertices at $(0, 0)$, $(3, 0)$, and $(0, 3)$.

a. Are X and Y independent? Why or why not?

b. Find the density $f_X(x)$ of X.

c. Find the density $f_Y(y)$ of Y.

2. Consider a pair of random variables X, Y with constant joint density on the quadrilateral with vertices $(0, 0)$, $(2, 0)$, $(2, 6)$, $(0, 12)$.

a. Are X and Y independent? Why or why not?

b. Find the density $f_X(x)$ of X.

c. Find the density $f_Y(y)$ of Y.

3. Let X, Y have joint density $f_{X,Y}(x,y) = 14e^{-2x-7y}$ for $x > 0$ and $y > 0$; and $f_{X,Y}(x,y) = 0$ otherwise.

a. Are X and Y independent? Why or why not?

b. Find the density $f_X(x)$ of X.

c. Find the density $f_Y(y)$ of Y.

4. Suppose X, Y has joint density

$$f_{X,Y}(x,y) = \begin{cases} 1/16 & \text{if } -2 \le x \le 2 \text{ and } -2 \le y \le 2, \\ 0 & \text{otherwise.} \end{cases}$$

a. Are X and Y independent? Why or why not?

b. Find the density $f_X(x)$ of X.

c. Find the density $f_Y(y)$ of Y.

5. Suppose X, Y has joint density

$$f_{X,Y}(x,y) = \begin{cases} \frac{1}{9}(3-x)(2-y) & \text{if } 0 \le x \le 3 \text{ and } 0 \le y \le 2, \\ 0 & \text{otherwise.} \end{cases}$$

a. Are X and Y independent? Why or why not?

b. Find the density $f_X(x)$ of X.

c. Find the density $f_Y(y)$ of Y.