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

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

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

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

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 $Y$. 
