1. Suppose that $X$ and $Y$ have joint probability density function $f_{X,Y}(x, y) = 15e^{-5x-3y}$ for $x > 0$ and $y > 0$, and $f_{X,Y}(x, y) = 0$ otherwise.

1a. Find $E(X)$.

1b. Find $E(Y)$.

2. Suppose that $X$ and $Y$ have joint density $f_{X,Y}(x, y) = 24e^{-5x-3y}$ for $y > x > 0$, and $f_{X,Y}(x, y) = 0$ otherwise.

2a. Find $E(X)$.

2b. Find $E(Y)$.

3. Consider a pair of random variables $X, Y$ with constant joint density on the triangle with vertices at $(0, 0)$, $(8, 0)$, and $(0, 4)$.

3a. Find $E(X)$.

3b. Find $E(Y)$.

4. Suppose that $X$ and $Y$ have joint probability density function

$$f_{X,Y}(x, y) = \begin{cases} \frac{1}{12}(4-xy) & \text{if } 0 < x < 2 \text{ and } 0 < y < 2 \\ 0 & \text{otherwise} \end{cases}$$

Find $E(X)$.

(Just as an interesting aside, notice that, by symmetry, in this case, $E(Y) = E(X)$.)