

1. Let X and Y be random variables with the following joint distribution:

	Y		
X	0	2	4
1	0.1	0.05	0.05
2	0.1	0.1	0.2
3	0.2	0.05	0.15

(a) Find $E(XY)$.

(b) $E(X) = 2.2$ and $E(Y) = 2$. Find the covariance of X and Y .

2. Let X and Y be continuous random variables with the following joint PF:

$$f(x, y) = \begin{cases} 12y^2 & \text{for } 0 \leq y \leq x \leq 1 \\ 0 & \text{otherwise.} \end{cases}$$

(a) Find the marginal distribution of X .

(b) Find the expectation of X .

(c) Given that $E(Y) = \frac{3}{5}$, find the covariance of X and Y .

(d) The variance of X is $\frac{2}{75}$ and the variance of Y is $\frac{1}{25}$. Find the correlation of X and Y .

(e) Find the variance of $X + Y$.

3. Let continuous X have the following PF:

$$f_x(x) = \begin{cases} 4x^3 & 0 < x < 1 \\ 0 & \text{otherwise.} \end{cases}$$

Let $Y = \sqrt{X}$. Find the PF of Y .