Probability Theory: Activity 8 Solutions

Let X be a random variable with the following PF:

$$f_x(x) = \begin{cases} \frac{x^2}{10} & \text{for } x = -2, -1, 0, 1, 2 \\ 0 & \text{otherwise.} \end{cases}$$

Let Y be a random variable with the following PF:

$$f_y(y) = \begin{cases} 0.1 & y = 0 \\ 0.2 & y = 1 \\ 0.3 & y = 2 \\ 0.4 & y = 3 \\ 0 & \text{otherwise.} \end{cases}$$

Find the following:

1. $E(X)$

$$E(X) = \sum_x x\frac{x^2}{10} = \frac{(-2)^3 + (-1)^3 + 0^3 + 1^3 + 2^3}{10} = 0.$$

2. $E(Y)$

$$E(Y) = \sum_y f_y(y) = 0(0.1) + 1(0.2) + 2(0.3) + 3(0.4) = 2$$

3. $E(X^2)$

$$E(X^2) = \sum_x x^2\frac{x^2}{10} = \frac{(-2)^4 + (-1)^4 + 0^3 + 1^4 + 2^4}{10} = 3.4.$$

4. $E(4X + 3)$

$$E(4X + 3) = 4E(X) + 3 = 4(0) + 3 = 3.$$

5. $E(3X^2 - 2Y + 1)$

$$E(3X^2 - 2Y + 1) = 3E(X^2) - 2E(Y) + 1 = 3(3.4) - 2(2) + 1 = 7.2$$