

Question: Suppose that two continuous random variables X and Y have a joint probability density function

$$f(x, y) = A(x - 3)y \quad -2 \leq x \leq 3 \quad 4 \leq y \leq 6$$

- a) What is the value of A?
- b) What is $P(0 \leq x \leq 1 \text{ and } 4 \leq y \leq 5)$?
- c) Construct the marginal probability density functions.
- d) Are the random variables X and Y independent?
- e) If $Y = 5$, what is the conditional probability density function of X?
- f) What are the expectation and variance of the random variable X and Y.
- g) What is the covariance of X and Y
- h) What is the correlation between X and Y