

HW 1

Problem 1 (3.8) Let X and Y have the joint density

$$f(x, y) = \frac{6}{7}(x + y)^2 \mathbb{I}\{0 \leq x \leq 1\} \mathbb{I}\{0 \leq y \leq 1\}.$$

- (a) Find the marginal densities for X and Y .
- (b) Find both conditional densities.

Problem 2 (4.4) Let X have the CDF $F(x) = 1 - x^{-a}\mathbb{I}\{x \geq 1\}$. Find $E(X)$ and $Var(X)$ for the values of a where they exist.

Problem 3 (4.16) Suppose $E(X) = \mu$ and $Var(X) = \sigma^2$. Let $Z = (X - \mu)/\sigma$. Show that $E(Z) = 0$ and $Var(Z) = 1$.

(a) Find the covariance of X and Y .

(b) Find $E(Y | X = x)$ for $0 \leq x \leq 1$.