116. Suppose the set of possible values for (X, Y) is the rectangle $\mathcal{A} = \{(x, y) : 0 \leq x \leq 1, 0 \leq y \leq 1\}$. Consider the function

$$f_{X,Y}(x, y) = C(x + y)^2, \quad (x, y) \in \mathcal{A}$$

(a) Prove $C = 6/7$ results in $f_{X,Y}(x, y)$ being a probability density function.

(b) Prove or disprove that X and Y are independent.

(c) Find the covariance of X and Y.