

Homework 8: Independent Random Variables

1. Suppose that X and Y are independent continuous random variables with

$$f_X(x) = \begin{cases} \frac{3x^2}{8}, & 0 < x < 2 \\ 0, & x < 0 \end{cases}$$

$$f_Y(y) = \begin{cases} y^{-2}, & 1 < y \\ 0, & y < 1 \end{cases}$$

- (a) Find $f_{X,Y}(x,y)$, the joint density function of X and Y .
 - (b) Find $P(XY > 1)$.
2. Let X and Y be jointly continuous with joint pdf $f_{X,Y}(x,y) = (24/5)(x+y)$, for $1 \leq 2y \leq x \leq 1$.
- (a) Find $f_X(x)$ and $f_Y(y)$.
 - (b) Are X and Y independent?
3. A point is chosen at random from the interior of a circle whose equation is $x^2 + y^2 \leq 4$. Let the random variables X and Y denote the x - and y -coordinates of sampled point. Find $f_{X,Y}(x,y)$.