

1. Let  $X$  and  $Y$  be independent random variables each uniformly distributed over  $(0, 1)$ . Find  $P(Y \geq X | Y \geq 1/2)$ .

$$P(Y \geq X | Y \geq 1/2) = \underline{\hspace{10em}}$$

2. Let  $X$  and  $Y$  be continuous random variables with joint density function

$$f(x, y) = \begin{cases} \frac{8}{3}xy & \text{for } 0 \leq x \leq 1, x \leq y \leq 2x \\ 0 & \text{otherwise} \end{cases}$$

Find the covariance of  $X$  and  $Y$ .

Answer \_\_\_\_\_