

125. The distribution of Y , given X , is uniform on the interval $[0, X]$. The marginal density of X is

$$f(x) = \begin{cases} 2x, & \text{for } 0 < x < 1 \\ 0, & \text{otherwise.} \end{cases}$$

Determine the conditional density of X , given $Y = y$, where positive.

- (A) 1
- (B) 2
- (C) $2x$
- (D) $\frac{1}{y}$
- (E) $\frac{1}{1-y}$