

145. Key: C

$$f(y | x = 0.75) = \frac{f(0.75, y)}{\int_0^1 f(0.75, y) dy} = \frac{f(0.75, y)}{1.125}.$$

Thus,

$$f(y | x = 0.75) = \begin{cases} 4/3 & \text{for } 0 < y < 0.5 \\ 2/3 & \text{for } 0.5 < y < 1 \end{cases},$$

which leads to $\text{Var}(Y | X = 0.75) = 11/144 = 0.076$.