Calculate $\text{Var}(\frac{Y}{X} | X = 1)$.

(A) 0.13
(B) 0.15
(C) 0.20
(D) 0.51
(E) 0.71

115. The stock prices of two companies at the end of any given year are modeled with random variables $X$ and $Y$ that follow a distribution with joint density function

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

What is the conditional variance of $Y$ given that $X = x$?

(A) $\frac{1}{12}$
(B) $\frac{7}{6}$
(C) $x + \frac{1}{2}$
(D) $x^2 - \frac{1}{6}$
(E) $x^2 + x + \frac{1}{3}$