

120. Solution: A

We are given that  $X$  denotes loss. In addition, denote the time required to process a claim by  $T$ .

Then the joint pdf of  $X$  and  $T$  is  $f(x,t) = \begin{cases} \frac{3}{8}x^2 \cdot \frac{1}{x} = \frac{3}{8}x, & x < t < 2x, 0 \leq x \leq 2 \\ 0, & \text{otherwise.} \end{cases}$

Now we can find  $P[T \geq 3] =$

$$\int_3^4 \int_{t/2}^2 \frac{3}{8} x dx dt = \int_3^4 \left[ \frac{3}{16} x^2 \right]_{t/2}^2 dt = \int_3^4 \left( \frac{12}{16} - \frac{3}{64} t^2 \right) dt = \left[ \frac{12}{16} t - \frac{1}{64} t^3 \right]_3^4 = \frac{12}{4} - 1 - \left( \frac{36}{16} - \frac{27}{64} \right) \\ = 11/64 = 0.17.$$

