

108. A device containing two key components fails when, and only when, both components fail. The lifetimes, T_1 and T_2 , of these components are independent with common density function $f(t) = e^{-t}$, $t > 0$. The cost, X , of operating the device until failure is $2T_1 + T_2$.

Which of the following is the density function of X for $x > 0$?

(A) $e^{-x/2} - e^{-x}$

(B) $2(e^{-x/2} - e^{-x})$

(C) $\frac{x^2 e^{-x}}{2}$

(D) $\frac{e^{-x/2}}{2}$

(E) $\frac{e^{-x/3}}{3}$