

Question #189

Answer: C

Constant force implies exponential lifetime

$$\text{Var}[T] = E[T^2] - (E[T])^2 = \frac{2}{\mu^2} - \left(\frac{1}{\mu}\right)^2 = \frac{1}{\mu^2} = 100$$

$$\mu = 0.1$$

$$\begin{aligned} E[\min(T, 10)] &= \int_0^{10} t(0.1)e^{-.1t} dt + \int_{10}^{\infty} 10(0.1)e^{-.1t} dt \\ &= -te^{-.1t} - 10e^{-.1t} \Big|_0^{10} - 10e^{-.1t} \Big|_{10}^{\infty} \\ &= -10e^{-1} - 10e^{-1} + 10 + 10e^{-1} \\ &= 10(1 - e^{-1}) = 6.3 \end{aligned}$$