

Question 116

Given μ is constant and uniformly distributed 0 to 2

$$\text{So } f(\mu) = \frac{1}{2-0} = \frac{1}{2}$$

$$\Pr[T \leq 1 | \mu] = 1 - \exp\left(-\int_0^1 \mu dt\right) = 1 - e^{-\mu}$$

$$\Pr[T \leq 1] = \int_0^2 \frac{(1 - e^{-\mu})}{2} d\mu$$

$$= \left[\frac{\mu}{2} + \frac{e^{-\mu}}{2} \right]_0^2 = \left[\frac{2}{2} + \frac{e^{-2}}{2} \right] - \left[\frac{0}{2} + \frac{e^{-0}}{2} \right]$$

$$= 1 + \frac{e^{-2}}{2} - \frac{1}{2} \approx .56767 \approx .57 \quad \square$$