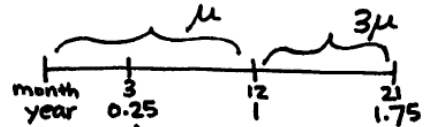


MLC #219



$$\begin{aligned} \Pr(T_x < 1.75 | T_x > 0.25) &= \frac{\Pr(0.25 < T_x < 1.75)}{\Pr(T_x > 0.25)} \\ &= \frac{0.25 | 1.5 q_x}{0.25 p_x} = \frac{0.25 p_x - 1.75 p_x}{0.25 p_x} \end{aligned}$$

$$\begin{aligned} {}_t p_x &= \exp\left[-\int_0^t \mu_{x+s} ds\right] \\ &= \exp\left[-\int_0^t \mu ds\right] \quad \text{constant force of mortality} \\ &= \exp\left[-\mu s \Big|_0^t\right] = \exp[-(\mu t - 0)] = e^{-\mu t} = {}_t p_x \end{aligned}$$

$$\begin{aligned} {}_2 p_x &= 0.10 = p_x \cdot p_{x+1} \\ 0.10 &= e^{-\mu(1)} \cdot e^{-3\mu(1)} = e^{-4\mu} \Rightarrow \mu = \frac{-\ln(0.1)}{4} = 0.5756 \end{aligned}$$

$$0.25 p_x = e^{-0.5756(0.25)} = 0.8660$$

$$\begin{aligned} 1.75 p_x &= p_x \cdot 0.75 p_{x+1} = e^{-\mu(1)} \cdot e^{-3\mu(0.75)} \\ &= e^{-\mu} \cdot e^{-2.25\mu} = e^{-3.25(0.5756)} = 0.1540 \end{aligned}$$

$$\frac{0.25 p_x - 1.75 p_x}{0.25 p_x} = \frac{0.866 - 0.154}{0.866} = 0.82 \text{ (E)}$$