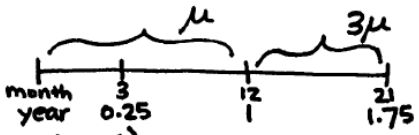
MLC #219



$$\Pr(T_x < 1.75 \mid T_x > 0.25) = \frac{\Pr(0.25 < T_x < 1.75)}{\Pr(T_x > 0.25)}$$

$$= \frac{{}_{0.25|1.5}q_x}{{}_{0.25}p_x} = \frac{{}_{0.25}p_x - {}_{1.75}p_x}{{}_{0.25}p_x}$$

$${}_tp_x = \exp\left[-\int_0^t \mu_{x+s}\, ds\right]$$

$$= \exp\left[-\int_0^t \mu\, ds\right] \quad \text{constant force of mortality}$$

$$= \exp\left[-\mu s\Big|_0^t\right] = \exp[-(\mu t - 0)] = e^{-\mu t} = {}_tp_x$$

$${}_2p_x = 0.10 = p_x \cdot p_{x+1}$$

$$0.10 = e^{-\mu(1)} \cdot e^{-3\mu(1)} = e^{-4\mu} \quad \Rightarrow \quad \mu = \frac{-\ln(0.1)}{4} = 0.5756$$

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

$${}_{1.75}p_x = p_x \cdot {}_{0.75}p_{x+1} = e^{-\mu(1)} \cdot e^{-3\mu(0.75)}$$

$$= e^{-\mu} \cdot e^{-2.25\mu} = e^{-3.25(.5756)} = 0.1540$$

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