

Solution # 33

Triple decrement table

constant forces of mortality:

$$\mu^{(1)} = .3$$

$$\mu^{(2)} = .5$$

$$\mu^{(3)} = .7$$

Calculate $q_x^{(2)} \rightarrow q_x^{(2)} = \frac{\mu^{(2)}}{\mu^{(T)}} q_x^{(T)}$

$$\begin{aligned} \mu^{(T)} &= \sum_i \mu^{(i)} \\ &= .3 + .5 + .7 = 1.5 \end{aligned}$$

$$\begin{aligned} q_x^{(T)} &= 1 - e^{-\mu^{(T)}} \\ &= 1 - e^{-1.5} \\ &= .7769 \end{aligned}$$

(derived from)

$$\begin{aligned} q_x^{(2)} &= q_x^{(T)} \left[\frac{\ln p_x^{(2)}}{\ln p_x^{(T)}} \right] & P_x &= e^{-\mu} \\ &= q_x^{(T)} \left[\frac{\ln e^{-\mu^{(2)}}}{\ln e^{-\mu^{(T)}}} \right] \\ &= q_x^{(T)} \left[\frac{\mu^{(2)}}{\mu^{(T)}} \right] \end{aligned}$$

$$q_x^{(2)} = \frac{.5}{1.5} (.7769) = .259$$

$$= .259 \quad \boxed{A}$$