Question #59
Answer: A

$$R = 1 - p_x = q_x$$

$$S = 1 - p_x \times e^{(-k)} \text{ since } e^{-\int_0^1 (\mu_{x+t}+k)dt} = e^{-\int_0^1 \mu_{x+t}\,dt - \int_0^1 k\,dt}$$

$$= e^{-\int_0^1 \mu_{x+t}\,dt} e^{-\int_0^1 k\,dt}$$

So $S = 0.75R \Rightarrow 1 - p_x \times e^{-k} = 0.75q_x$

$$e^{-k} = \frac{1 - 0.75q_x}{p_x}$$

$$e^{k} = \frac{p_x}{1 - 0.75q_x} = \frac{1 - q_x}{1 - 0.75q_x}$$

$$k = \ln\left[\frac{1 - q_x}{1 - 0.75q_x}\right]$$