

Question #262

Answer: C

$${}_tP_x = \frac{95-x-t}{95-x}, \quad \mu_{x+t} = \frac{1}{95-x-t}, \quad {}_tP_y = e^{-\mu t}$$

$$\begin{aligned} \Pr(x \text{ dies within } n \text{ years and before } y) &= \int_0^n {}_tP_x {}_tP_y \mu_{x+t} dt \\ &= \int_0^n \frac{95-x-t}{95-x} e^{-\mu t} \frac{1}{95-x-t} dt = \frac{1}{95-x} \int_0^n e^{-\mu t} dt = \frac{1-e^{-\mu n}}{\mu(95-x)} \end{aligned}$$