

### Question #193

Answer: E

$$\text{Recall } \overset{\circ}{e}_x = \frac{\omega - x}{2}$$

$$\overset{\circ}{e}_{x:x} = \overset{\circ}{e}_x + \overset{\circ}{e}_x - \overset{\circ}{e}_{x:x}$$

$$\overset{\circ}{e}_{x:x} = \int_0^{\omega-x} \left(1 - \frac{t}{\omega-x}\right) \left(1 - \frac{t}{\omega-y}\right) dt$$

Performing the integration we obtain

$$\overset{\circ}{e}_{x:x} = \frac{\omega - x}{3}$$

$$\overset{\circ}{e}_{x:x} = \frac{2(\omega - x)}{3}$$

$$(i) \quad \frac{2(\omega - 2a)}{3} = 3 \times \frac{2(\omega - 3a)}{3} \Rightarrow 2\omega = 7a$$

$$(ii) \quad \frac{2}{3}(\omega - a) = k \times \frac{2(\omega - 3a)}{3}$$

$$3.5a - a = k(3.5a - 3a)$$

$$k = 5$$

The solution assumes that all lifetimes are independent.