Question #98
Answer: E

For the general survival function $S_0(t) = 1 - \frac{t}{\omega}, 0 \le t \le \omega$,

$$\begin{aligned} \mathring{e}_{30} &= \int_0^{\omega-30} \left(1 - \frac{t}{\omega - 30}\right) dt \\ &= \left[t - \frac{t^2}{2(\omega - 30)} \right]_0^{\omega-30} \\ &= \frac{\omega - 30}{2} \end{aligned}$$

Prior to medical breakthrough $\omega = 100 \Rightarrow \mathring{e}_{30} = \frac{100 - 30}{2} = 35$

After medical breakthrough $\mathring{e}'_{30} = \mathring{e}_{30} + 4 = 39$

so $\mathring{e}'_{30} = 39 = \frac{\omega' - 30}{2} \Rightarrow \omega' = 108$