

Question #261

Key: D

We have $q^{(T)} = 1 - (1 - q'^{(1)})(1 - q'^{(2)})$ and so $q'^{(1)} = 1 - \frac{1 - q^{(T)}}{1 - q'^{(2)}} = 1 - \frac{1 - q^{(T)}}{1 - 0.05} = \frac{q^{(T)} - 0.05}{0.95}$.

Then, ${}_{20}q'_0{}^{(1)} = 0.05 / 0.95 = 0.05263$, ${}_{20}q'_{20}{}^{(1)} = 0.132 / 0.95 = 0.1389$, and

${}_{40}p'_0{}^{(1)} = 0.9474(0.8611) = 0.8158$. Out of 1000 at age 0, 816 are expected to survive to age 40.