d. 0.066
e. 0.007

The right answer is c

Your answer was Unanswered

Here is one way of doing this problem:

We can easily ad a column for $p_x^{(\tau)}$ as follows: Use the fact that

$$q_x^{(\tau)} = \left(q_x^{(1)} + q_x^{(2)} + q_x^{(3)}\right)$$

to fill this column up.

x	$q_x^{(1)}$	$q_x^{(2)}$	$q_x^{(3)}$	$q_x^{(\tau)}$
37	0.15	0.05	0.15	0.35
38	0.05	0.08	0.10	0.23
39	0.03	0.16	0.02	0.21
40	0.07	0.10	0.11	0.28
41	0.15	0.08	0.06	0.29
42	0.15	0.15	0.14	0.44

Recall that

$$\begin{aligned} \mu_x^{(j)}(t) &= \frac{q_x^{(j)}}{{}_tp_x^{(\tau)}} \\ &= \frac{q_x^{(j)}}{1 - \mathrm{t}q_x^{(\tau)}} \\ \mu_{41}^{(2)}(0.14) &= \frac{q_{41}^{(2)}}{1-(0.14)q_{41}^{(\tau)}} \\ &= \frac{0.08}{1-(0.14)(0.29)} \\ &= 0.083385 \end{aligned}$$

The time is 9:39

23. In a double-decrement table, you are given the following information:

x	$q_x^{(1)}$	$q_x^{(2)}$	$q'^{(1)}_x$	$q'^{(2)}_x$
36	0.23	0.08	-	y
37	-	-	0.16	$2y$

Assume that each decrement is uniformly distributed over each year of age in the double-decrement table.
If $l_{36}^{(\tau)}$ = 2,200, Calculate $l_{38}^{(\tau)}$.

a. 1,000
b. 1,080
c. 1,010
d. 1,070
e. 1,040

The right answer is e

Your answer was Unanswered

Here is one way of doing this problem:

$$l_{38}^{(\tau)} = l_{36}^{(\tau)} \; p_{36}^{(\tau)} \quad p_{37}^{(\tau)} = l_{36}^{(\tau)}\left(1 - q_{36}^{(\tau)}\right)\left(1 - q_{37}^{(\tau)}\right)$$

$$q_{36}^{(\tau)} = q_{36}^{(1)} + q_{36}^{(2)} = 0.23 + 0.08 = 0.31$$

$$p_{36}^{(\tau)} = 1 - 0.31 = 0.69$$

We still need to calculate $q_{37}^{(\tau)}$.

$$y = q'^{(2)}_{36} = 1 - p'^{(2)}_{36} = 1 - \left(p_{36}^{(\tau)}\right)^{\frac{q_{36}^{(2)}}{q_{36}^{(\tau)}}} = 1 - (0.69)^{\left(\frac{0.08}{0.31}\right)} = 0.0913$$

$$2y = q'^{(2)}_{37} = 2(0.0913) = 0.1826$$

$$\begin{aligned} q_{37}^{(\tau)} &= 1 - p_{37}^{(\tau)} \\ &= 1 - p'^{(1)}_{37} \; p'^{(2}_{37} \\ &= 1 - \left(1 - q'^{(1)}_{37}\right)\left(1 - q'^{(2}_{37}\right) \\ &= 1 - (1 - 0.16)(1 - 0.1826) = 0.3134 \end{aligned}$$

$$l_{38}^{(\tau)} = l_{36}^{(\tau)}\left(1 - q_{36}^{(\tau)}\right)\left(1 - q_{37}^{(\tau)}\right) = (2,200)(1 - 0.31)(1 - 0.3134) = 1042.2588$$

The time is 9:39

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24. You are given the following information about $q_x^{(j)}$

(i) In a double decrement model:
  (a) $j = 1$ if the cause of death is beri-beri.
  (b) $j = 2$ if the cause of death is other than beri-beri.
(ii) $q_x^{(\tau)} = \frac{x}{100}$
(iii) $q_x^{(1)} = \frac{1}{2} q_x^{(1)}$

Calculate the probability that an individual age 45 will die from Beri-Beri within 3 years.

a. 0.319
b. 0.232
c. 0.184
d. 0.281
e. 0.191

The right answer is d

Your answer was Unanswered