MAP 4175 / 5177
Test 10

Name: KEY

Date: November 6, 2019

Show all work for full credit, and use correct notation. Simplify answers completely.
See other side for additional problems.

1. (10 points) For a double decrement model, $q_x^{(1)} = 0.06$, $q_x^{(2)} = 0.19$, and $q_x'^{(2)} = 0.20$. Determine $q_x'^{(1)}$.

$q_x^{(\tau)} = .06 + .19 = 0.25 \Rightarrow p_x^{(\tau)} = 0.75 = p_x'^{(1)} \cdot (0.8)$

$\therefore p_x'^{(1)} = 0.9375 \Rightarrow q_x'^{(1)} = 0.0625$

2. You are given the double decrement table:

x	$l_x^{(\tau)}$	$d_x^{(1)}$	$q_x^{(1)}$	$d_x^{(2)}$	$q_x^{(2)}$
55	1000	- 200	0.20	100	-
56	- 700	100	-	200	-
57	- 400	-	-	-	-

Determine

(a) (10 points) $q_{56}^{(2)} = \frac{d_{56}^{(2)}}{l_{56}} = \frac{2}{7}$

(b) (10 points) ${}_2q_{55}^{(\tau)} = \frac{l_{57}}{l_{55}} = \frac{4}{10} = 0.4$

3. (5 points each) Use the L-TAM Standard Service Table to determine

(a) $q_{40}^{(w)} = \frac{w_{40}}{l_{40}} = 0.0487\ldots$

(b) ${}_5q_{45}^{(d)} = \frac{{}_5d_{45}^{(d)}}{l_{45}} = \frac{d_{45}+d_{46}+d_{47}+d_{48}+d_{49}}{l_{45}}$

$= 0.004368\ldots$

(c) ${}_3p_{58}^{(\tau)} = \frac{l_{61}}{l_{58}} = 0.6008\ldots$

(d) ${}_{3|2}q_{57}^{(r)} = \frac{{}_2d_{60}^{(r)}}{l_{57}} = \frac{r_{60}(\text{both}) + r_{61}}{l_{57}} = 0.397\ldots$