MAP 4175 / 5177 Name:_____
Test 12 Date: November 20, 2019

Each problem is worth 10 points. Show all work for full credit, and use correct notation. Simplify answers completely. See other side for additional problems.

For Numbers 1 and 2, you are given a two decrement model with
$p_x'^{(1)} = 0.8$,
$p_x'^{(2)} = 0.6$, and
decrement 1 is uniformly distributed in its associated single decrement model.

1. Determine $q_x^{(1)}$ assuming decrement 2 is a discrete middle of the year decrement

2. Determine $q_x^{(1)}$ assuming decrement 2 is a discrete decrement with 40% of the decrement occurring at time $t = 0.4$ and the rest occurring at time $t = 0.6$

For Numbers 3 through 5, you are given a four state model with

$\mu_x^{01} = 0.010 \quad \mu_x^{02} = \mu_x^{12} = 0.060 \quad \mu_x^{03} = \mu_x^{13} = 0.001 \quad \mu_x^{10} = 0.006 \quad \mu_x^{32} = 0.080$
All other forces of transition are equal to zero. (This is implied if not otherwise stated.)

3. Determine ${}_{10}p_x^{33}$

4. Determine ${}_{10}p_x^{\overline{00}}$

5. Determine ${}_{10}p_x^{32}$