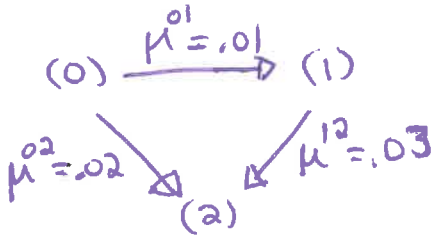
MAP 4175 / 5177 Name:_____

Quiz 9 Date: November 8, 2017

Show all work for full credit, and use correct notation. Simplify answers completely.

For a multi-state model with states 0, 1, and 2, you are given:

$$\mu_x^{01} = 0.01 \quad \mu_x^{02} = 0.02 \quad \mu_x^{12} = 0.03$$



All other transition intensities are equal to 0. Determine

1. ${}_{10}p_x^{00}$

$${}_{10}p_x^{00} = {}_{10}p_x^{\overline{00}} = e^{-\int_0^{10}(\mu_{x+t}^{01} + \mu_{x+t}^{02})\,dt} = e^{-\int_0^{10} .03\,dt}$$

$$\Rightarrow {}_{10}p_x^{00} = e^{-.03(10)} = e^{-.3} = 0.740\ldots$$

2. ${}_{10}p_x^{11}$

$${}_{10}p_x^{11} = {}_{10}p_x^{\overline{11}} = e^{-\int_0^{10}\mu_{x+t}^{12}\,dt} = e^{-\int_0^{10}.03\,dt}$$

$$\Rightarrow {}_{10}p_x^{11} = e^{-.03(10)} = e^{-.3} = 0.740\ldots$$

3. ${}_{10}p_x^{22} = 1$

4. ${}_{10}p_x^{10} = 0$

5. If ${}_{10}p_x^{01} = 0.082$, then determine ${}_{10}p_x^{02}$.

$${}_{10}p_x^{02} = 1 - {}_{10}p_x^{00} - {}_{10}p_x^{01}$$

$$= 1 - (0.740\ldots) - 0.082 = 0.177\ldots$$