MATH 3630 - Actuarial Mathematics I
Fall 2015 - Valdez
Homework No. 2
due Wednesday, 5:00 PM, 30 September 2015

Please return this page with your signature. Please write your name and student number at the spaces provided:

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Suppose that a life table follows the following formula:

$$\ell_x = 1000\, e^{-0.01x}, \text{ for } x \geq 0.$$

1. Calculate the probability that a person now age 35 will survive to reach age 65.
2. Calculate the probability that a person now age 35 will survive to reach age 65, but dies the following 10 years.
3. Calculate e_{35}, the curtate expectation of life for a person now age 35.

(1) $${}_{30}p_{35} = \frac{\ell_{65}}{\ell_{30}} = \frac{1000\, e^{-.01(65)}}{1000\, e^{-.01(35)}} = e^{-.01(30)} = \underline{0.7408182}$$

(2) $${}_{30|10}q_{35} = \frac{\ell_{65} - \ell_{75}}{\ell_{35}} = \frac{1000\, e^{-.01(65)} - 1000\, e^{-.01(75)}}{1000\, e^{-.01(35)}} = e^{-.01(30)} - e^{-.01(40)}$$
$$= \underline{0.07049817}$$

(3) $$e_{35} = \sum_{k=1}^{\infty} {}_kp_{35} = \sum_{k=1}^{\infty} \frac{\ell_{35+k}}{\ell_{35}} = \sum_{k=1}^{\infty} \frac{1000\, e^{-.01(35+k)}}{1000\, e^{-.01(35)}}$$
$$= \sum_{k=1}^{\infty} e^{-.01k} = \frac{e^{-.01}}{1 - e^{-.01}} = \underline{99.50083}$$