

MATH 3630 - Actuarial Mathematics I  
Fall 2008 - Valdez  
Homework No. 2  
due Wednesday, 6:50 PM, September 17, 2008

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Suppose you are given:

$$S_X(x) = 1 - .005x - .00005x^2.$$

1. Construct the  $l_x$ ,  $d_x$ ,  $q_x$  and  $p_x$  columns of the corresponding mortality table for ages 0, 1 and 2. Use a radix of 100,000.
2. Using the table above and assuming a Uniform Distribution of Death (UDD) over each year of age interval, calculate the following:
  - (a)  $d_{1.4}$
  - (b)  $0.25q_1$
  - (c)  $1.5p_0$
  - (d)  $\mu_{1.35}$

# Math 3630 - Solutions - Homework 2

With radix  $l_0$ ,  $l_x = l_0 S_x(x)$

$$= l_0 (1 - .005x - .00005x^2)$$

(1)

<u>x</u>	<u><math>l_x</math></u>	<u><math>d_x</math></u>	<u><math>q_x</math></u>	<u><math>p_x</math></u>
0	100,000	505	.005050	.994950
1	99,495	515	.005176	.994824
2	98,980	525	.005304	.994696
3	98,455			

(2) UDD assumption

$$\begin{aligned} (a) d_{1.4} &= l_{1.4} - l_{2.4} \\ &= 99289 - 98770 \\ &= \underline{519} \end{aligned}$$

$$l_{1.4} = .6l_1 + .4l_2 = 99289$$

$$l_{2.4} = .6l_2 + .4l_3 = 98770$$

$$(b) 0.25q_1 = 0.25 * q_1 = 0.25 * (.005176) = \underline{.001294}$$

$$(c) {}_{1.5}P_0 = P_0 * 0.5p_1 = .994950 * (1 - .5(.005176)) = \underline{.992375}$$

$$(d) \mu_{1.35} = \frac{q_1}{1 - .35q_1} = \frac{.005176}{1 - .35(.005176)} = \underline{.005186}$$