MATH 3630 - Actuarial Mathematics I
Fall 2009 - Valdez
Homework No. 2
due Monday, 6:50 PM, 12 October 2009

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

Name: SUGGESTED SOLUTION **Student ID:** EMIL

I certify that this is my own work, and that I have not copied the work of another student.

Signature: _____ **Date:** _____

Suppose you are given:

$$S_X(x) = \frac{1}{10}\sqrt{100 - x}, \quad \text{for } 0 \le x \le 100.$$

1. Construct the ℓ_x, d_x, q_x and p_x columns of the corresponding mortality table for ages 10, 11 and 12. Use a radix of 100,000.

2. Using the table above and assuming a constant force (exponential interpolation) over each year of age interval, calculate the following:

   (a) $d_{11.4}$

   (b) ${}_{0.25}q_{11}$

   (c) ${}_{1.5}p_{10}$

   (d) $\mu_{11.35}$

With radix $l_0 = 100000$,

$$l_x = l_0 \, S_x(x)$$

$$= 100000 \, \frac{1}{10} \sqrt{100 - x}$$

$$= 10000 \sqrt{100 - x}, \quad 0 \le x \le 100$$

(1)

x	l_x	d_x ← $l_x - l_{x+1}$	q_x ← d_x / l_x	p_x ← $1 - q_x$
10	94,868	529	.00557	.99443
11	94,340	531	.00563	.99437
12	93,808	535	.00570	.99430
13	93,274			

(2) constant force over each year of interval

(a) $d_{11.4} = l_{11.4} - l_{12.4}$

$= 94127 - 93594$

$= 533$

$l_{11.4} = l_{11}^{.6} \, l_{12}^{.4} = 94127$

$l_{12.4} = l_{12}^{.6} \, l_{13}^{.4} = 93594$

(b) $_{.25}q_{11} = 1 - {}_{.25}p_{11} = 1 - p_{11}^{.25}$

$= 1 - (.99437)^{.25} = .00141$

(c) ${}_{1.5}p_{10} = p_{10} * {}_{0.5}p_{11} = p_{10} * p_{11}^{.5}$

$= (.99443) * (.99437)^{.5}$

$= .99162$

(d) $\mu_{11.35} = -\log p_{11} = -\log(.99437)$

$= .00565$