MATH 3630 - Actuarial Mathematics I
Fall 2008 - Valdez
Homework No. 4
due Wednesday, 6:50 PM, October 22, 2008

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:** _____

A life insurance policy is issued to age 30 with the following decreasing scale of death benefits:

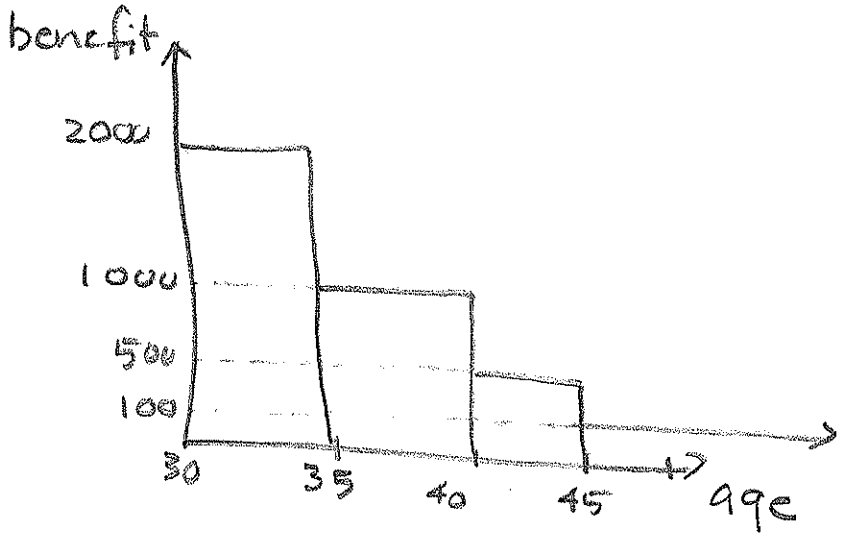
age	death benefit
30-35	2,000
35-40	1,000
40-45	500
over 45	100

Assume the benefits are payable at the end of the year of death and that:

- mortality follows the Illustrative Life Table; and
- $i = 6\%$.

Calculate the actuarial present value of the benefits for this policy. (Your answer must be a number!)

Homework 4



$$APV = 2000\, A^{1}_{30:\overline{5}|} + 1000\, {}_{5}E_{30}\, A^{1}_{35:\overline{5}|} + 500\, {}_{10}E_{30}\, A^{1}_{40:\overline{5}|} + 100\, {}_{10}E_{30}\, {}_{5}E_{40}\, A_{45}$$

where

$$A^{1}_{30:\overline{5}|} = A_{30} - {}_{5}E_{30}\, A_{35} = \frac{102.48}{1000} - \frac{740.91}{1000}\,\frac{128.72}{1000} = 0.007110$$

$$A^{1}_{35:\overline{5}|} = A_{35} - {}_{5}E_{35}\, A_{40} = \frac{128.72}{1000} - \frac{738.73}{1000}\,\frac{161.32}{1000} = 0.009548$$

$$A^{1}_{40:\overline{5}|} = A_{40} - {}_{5}E_{40}\, A_{45} = \frac{161.32}{1000} - \frac{735.29}{1000}\,\frac{301.20}{1000} = 0.013380$$

continued next page

The APV of the benefits equals

$$APV = 2000(.00711) + 1000(.74091)(.009548) + 500(.54733)(.013580) + 100(.54733)(.73529)(.20120)$$

$$= 14.22013 + 7.074265 + 3.661542 + 8.097219$$

$$= \underline{33.053316}$$