

MATH 3631 - Actuarial Mathematics II
 Spring 2018 - Valdez
 Quiz No. 3
 Monday, 26 February 2018

Name: EMIL Student ID: Suggested Solution

An insurance company issues 500 fully discrete whole life insurance policies of \$100,000 to individuals age 55 with independent future lifetimes. You are given:

- The following actual and expected experience in year 11:

Experience	actual	expected
Gross annual premium	\$ 6000	\$ 6000
Maintenance expenses per policy (payable b.o.y.)	425	300
Claim expenses per policy (payable at death)	125	200
q_{65}	0.06	0.04
Annual effective rate of interest	0.062	0.050

- Profits are calculated based on the following (per policy) gross premium reserves:

$${}_{10}V^g = 30,000 \quad {}_{11}V^g = 34,872$$

- At the end of the 10th year, 325 (of these) insurances remain in force.

Calculate the total gain or loss for the 11th year on this portfolio.

$${}_{11}V^A = 325 \times \left[\frac{(30000 + 6000 - 425)(1.062) - (100000 + 125 - 34872) \times 0.06}{1.062} \right]$$

$$= 11,006,728$$

$$\text{Profit for Year 11} = {}_{11}V^A - 325 * 34872 = \underline{\underline{-327,122.20}}$$

$$\text{If you recalculated } {}_{11}V^E \text{ as } 325 \times \left[\frac{(30000 + 6000 - 300)(1.05) - (100000 + 200 - 34872) \times 0.04}{1.05} \right]$$

$$= 11,333,361$$

$$\text{then Profit for Year 11} = \underline{\underline{-327,083.20}}$$

"Difference is due to rounding"