

EXAM MLC QUESTIONS OF THE WEEK

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Week of February 11/08

A fully discrete life insurance policy has contract premium Q payable at the start of each year and a death benefit of 250,000.

Interest is at annual effective rate 3.4%.

If death occurs in year k , the issue date loss will be 77,125.07
and if death occurs in year $k + 1$, the issue date loss will be 69,089.04 .
(k is an integer).

Find the issue date loss if death occurs in year $2k$.

The solution can be found below.

Week of February 11/08 - Solution

$$l_k = 250,000v^k - Q\ddot{a}_{\overline{k}|.034} = 77,125.07$$

$$\text{and } l_{k+1} = 250,000v^{k+1} - Q\ddot{a}_{\overline{k+1}|.034} = 69,089.04 .$$

$$\text{We also have } l_{k+1} = v \cdot l_k - Q \text{ so that } Q = \frac{77,125.07}{1.034} - 69,089.04 = 5500 .$$

$$\text{We now get the equation } 250,000v^k - 5500\left(\frac{1-v^k}{1-v}\right) = 77,125.07 .$$

$$\text{Since } v = \frac{1}{1.034} \text{ we can solve for } v^k \text{ to get } v^k = .5857 .$$

$$\text{Then } l_{2k} = 250,000v^{2k} - 5500\ddot{a}_{\overline{2k}|.034} = 250,000(.5857)^2 - 5500\left(\frac{1-.5857^2}{1-v}\right) = 24,124 .$$