EXAM MLC QUESTIONS OF THE WEEK

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Week of February 18/08

You are given the following benefit premium values all based on the same life table and interest rate.

$$P_{x:\overline{n}|} = .060714 \ , \ P_{x:\overline{n+1}|} = .054970 \ , \ P_{\frac{1}{x:\overline{n}|}} = .049513$$

Find the annual effective rate of interest i used in the premium valuation

The solution can be found below.

Week of February 18/08 - Solution

$P_{x:\overline{n}|} = \frac{1}{\ddot{a}_{x:\overline{n}|}} - d = 060714$,

$P_{x:\overline{n+1}|} = \frac{1}{\ddot{a}_{x:\overline{n+1}|}} - d = 054970$,

$P_{\frac{1}{x:\overline{n}|}} = \frac{v^n \, {}_np_x}{\ddot{a}_{x:\overline{n}|}} = .049513 \;\rightarrow\; v^n \, {}_np_x = .049513\ddot{a}_{x:\overline{n}|}$.

Then from $\ddot{a}_{x:\overline{n+1}|} = \ddot{a}_{x:\overline{n}|} + v^n \, {}_np_x$, we get

$.060714 - .054970 = .005744$

$= P_{x:\overline{n}|} - P_{x:\overline{n+1}|} = \frac{1}{\ddot{a}_{x:\overline{n}|}} - d - (\frac{1}{\ddot{a}_{x:\overline{n}|} + v^n \, {}_np_x} - d)$

$= \frac{1}{\ddot{a}_{x:\overline{n}|}} - \frac{1}{\ddot{a}_{x:\overline{n}|} + .049513\ddot{a}_{x:\overline{n}|}} = \frac{1}{\ddot{a}_{x:\overline{n}|}}[1 - \frac{1}{1.049513}]$

and then $\ddot{a}_{x:\overline{n}|} = 8.213$ and $d = \frac{1}{\ddot{a}_{x:\overline{n}|}} - P_{x:\overline{n}|} = .061044$

and $i = \frac{d}{1-d} = .065$.