EXAM MLC QUESTIONS OF THE WEEK

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Week of August 20/07

You are given the following annuity values $(t < n)$:

$\ddot{a}_{x:\overline{n}|} = 12.295$, $\ddot{a}_{x:\overline{t}|} = 9.966$, $\ddot{s}_{x:\overline{n}|} = 61.321$, $\ddot{s}_{x:\overline{t}|} = 27.731$

Find the value of ${}_tV^{1}_{x:\overline{n}|}$.

The solution can be found below.

Week of August 20/07 - Solution

We use the following identities.

(1) ${}_tV_{\underline{1}\,x:\overline{n}|} = {}_tV_{x:\overline{n}|} - {}_tV_{x:\underline{1}\,\overline{n}|}$

(2) ${}_tV_{x:\overline{n}|} = 1 - \frac{\ddot{a}_{x+t:\overline{n-t}|}}{\ddot{a}_{x:\overline{n}|}}$,

(3) $\ddot{a}_{x:\overline{t}|} = v^t\,{}_tp_x\,\ddot{s}_{x:\overline{t}|}$

(4) $\ddot{a}_{x:\overline{n}|} = \ddot{a}_{x:\overline{t}|} + v^t\,{}_tp_x\,\ddot{a}_{x+t:\overline{n-t}|}$

(5) ${}_tV_{x:\underline{1}\,\overline{n}|} = P_{x:\underline{1}\,\overline{n}|}\cdot\ddot{s}_{x:\overline{t}|} = \frac{\ddot{s}_{x:\overline{t}|}}{\ddot{s}_{x:\overline{n}|}}$

From (5) we have ${}_tV_{x:\underline{1}\,\overline{n}|} = \frac{27.731}{61.321} = .452$.

From (3) we have $v^t\,{}_tp_x = \frac{9.966}{27.731} = .359$.

From (4) we have $\ddot{a}_{x+t:\overline{n-t}|} = \frac{12.295-9.966}{.359} = 6.487$.

From (2) we have ${}_tV_{x:\overline{n}|} = 1 - \frac{6.487}{12.295} = .472$.

From (1) we have ${}_tV_{\underline{1}\,x:\overline{n}|} = .472 - .452 = .020$.