

MLC Module 1 Section 6 Exercises

1. Given ${}_t p_x = e^{-.02t}$, determine

(a) ${}^o e_x$

(b) e_x

2. Given ${}_t p_{\overline{xy}} = e^{-.02t}$, determine

(a) ${}^o e_{\overline{xy}}$

(b) $e_{\overline{xy}}$

3. Determine the value of $T_{\overline{xy}}$ if $T_x + T_y = 40$ and $T_x T_y = 346.71$.

4. Given mortality for (50) follows a DML(120) model, determine

(a) ${}^o e_{50:\overline{10}|}$

(b) $e_{50:\overline{10}|}$

5. Given mortality for (x) follows a CF($\mu = .025$) model, determine

(a) ${}^o e_{x:\overline{5}|}$

(b) $e_{x:\overline{5}|}$

6. Given ${}_t p_{xy} = (1.02)^{-t}$, determine $e_{xy:\overline{20}|}$

7. Given $q_{80} = .05$ and $q_{81} = .10$

(a) determine $e_{80:\overline{2}|}$

(b) if $e_{80} = 6.08$, determine e_{82}

8. Assume the T_{30} values for five 30-year olds are: 12.7, 8.6, 26.3, 47.9, 34.5
Then, for this population of 30-year olds, determine

(a) ${}^o e_{30}$

(b) e_{30}

(c) ${}^o e_{30:\overline{10}|}$

(d) $e_{30:\overline{10}|}$

(e) ${}^o e_{30:\overline{30}|}$

(f) $e_{30:\overline{30}|}$

(g) ${}_{10}p_{30}$

9. From the previous problem, note that there are four 30-year olds that live to age 40.
For this population of 40-year olds, determine

(a) the four T_{40} values

(b) ${}^o e_{40}$

(c) e_{40}

(d) ${}^o e_{40:\overline{20}|}$

(e) $e_{40:\overline{20}|}$

10. Use the results from the previous two problems to verify the following recursion formulas:

(a) ${}^o e_{30} = {}^o e_{30:\overline{10}|} + {}_{10}p_{30} \cdot {}^o e_{40}$

(b) $e_{30} = e_{30:\overline{10}|} + {}_{10}p_{30} \cdot e_{40}$

(c) ${}^o e_{30:\overline{30}|} = {}^o e_{30:\overline{10}|} + {}_{10}p_{30} \cdot {}^o e_{40:\overline{20}|}$

(d) $e_{30:\overline{30}|} = e_{30:\overline{10}|} + {}_{10}p_{30} \cdot e_{40:\overline{20}|}$