

MLC Module 1 Section 5 Exercises

1. For a 2-year select period, you are given:

$$q_{[x]} = 0.8q_x$$

$$q_{[x]+1} = 0.9q_{x+1}$$

$$q_{50+k} = 0.02 + 0.005k \text{ for } k = 0, 1, \text{ and } 2$$

(a) Determine $l_{[50]}$ given $l_{50} = 1000$

(b) Determine l_{50} given $l_{[50]} = 1000$

(c) Determine the probability that a person selected for insurance at age 50 dies between ages 52 and 53

(d) Determine the probability that a person selected for insurance at age 50 dies between ages 51.4 and 52.7 using a UDD assumption

(e) Determine the probability that a person selected for insurance at age 50 dies between ages 51.4 and 52.7 using a CF assumption

(f) Given $e_{52} = 9$ determine ${}^o e_{[50]}$ assuming a uniform distribution of deaths between integer ages

2. You are given the following select-and-ultimate table for a 3-year select period:

x	$q_{[x]}$	$q_{[x-1]+1}$	$q_{[x-2]+2}$	q_x
60	0.09	0.10	0.11	0.12
61	0.10	0.11	0.12	0.13
62	0.11	0.12	0.13	0.14
63	0.12	0.13	0.14	0.15
64	0.13	0.14	0.15	0.16

(a) Determine the probability that a person selected at age 60 dies between ages 62 and 63

(b) Determine the probability that a person selected at age 60 dies between ages 63 and 64

(c) Determine the probability that a person selected at age 60, who is now age 61, dies between ages 62 and 64

3. For a life table with a 1-year select period, you are given:

$$p_{[80]} = \frac{91}{100}$$

$$p_{81} = \frac{83}{91}$$

$$p_{[81]} = \frac{83}{92}$$

$$e_{[80]} = 8$$

Determine $e_{[81]}$