

Last updated June 5, 2019.

1. [First Pass] For a life aged 50, the curtate-expectation of life  $e_{50} = 20$ . For that same life, you are also given that  $p_{50} = 0.97$ .

Determine  $e_{51}$ .

- A. Less than 18.75
- B. At least 18.75, but less than 19.00
- C. At least 19.00, but less than 19.25
- D. At least 19.25, but less than 19.50
- E. At least 19.50

2. [First Pass] You are given:

$x$	$l_x$
96	180
97	130
98	73
99	31
100	0

Define  $K$  to be the curtate future lifetime of (96). Calculate  $\text{Var}(K)$ .

- A. 0.39                      B. 0.53                      C. 0.91                      D. 1.11                      E. 1.50

3. [SOA.MLC.021; 3-SOA.F03.28] For  $(x)$ :

- $K$  is the curtate future lifetime random variable.
- $q_{x+k} = 0.1(k+1)$ ,  $k = 0, 1, 2, \dots, 9$
- $X = \min(K, 3)$

Calculate  $\text{Var}(X)$ .

- A. 1.1                      B. 1.2                      C. 1.3                      D. 1.4                      E. 1.5

4. [SOA.MLC.145; 3.F00.25] Given:

- Superscripts  $M$  and  $N$  identify two forces of mortality and the curtate expectations of life calculated from them.
- $\mu_{25+t}^N = \begin{cases} \mu_{25+t}^M + 0.1(1-t) & 0 \leq t \leq 1 \\ \mu_{25+t}^M & t > 1 \end{cases}$
- $e_{25}^M = 10.0$

Calculate  $e_{25}^N$ .

A. 9.2

B. 9.3

C. 9.4

D. 9.5

E. 9.6