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.
- $q_{x+k} = 0.1(k+1)$, $k = 0, 1, 2, \ldots, 9$
- $X = \min(K, 3)$

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.
- $\mu^N_{25+t} = \begin{cases} \mu^M_{25+t} + 0.1(1-t) & 0 \le t \le 1 \\ \mu^M_{25+t} & t > 1 \end{cases}$
- $e^M_{25} = 10.0$

Calculate e^N_{25}.

A. 9.2 B. 9.3 C. 9.4 D. 9.5 E. 9.6