

15. Sam, aged 20, purchases a 3-year term life insurance policy. Level annual premiums are due at the beginning of each of the three years. A death benefit of \$100,000 is payable at the end of the year of death.

Assume the survival function is:  $s(x) = 1 - \frac{x}{80}$ , and  $i = 0.05$ .

DML  $w = 80$

Determine the annual benefit premium for this insurance.

- A. Less than \$1,475
- B. At least \$1,475, but less than \$1,525
- C. At least \$1,525, but less than \$1,575
- D. At least \$1,575, but less than \$1,625**
- E. At least \$1,625

$$P_{20:\overline{3}|} = \frac{A_{20:\overline{3}|}^1}{\ddot{a}_{20:\overline{3}|}} = \frac{.04539}{2.81325}$$

$$A_{20:\overline{3}|}^1 = \frac{a_{\overline{3}| i=0.05}}{60} = .04539$$

$$\begin{aligned} \ddot{a}_{20:\overline{3}|} &= \frac{1 - (A_{20:\overline{3}|}^1 + {}_3E_{20})}{d} \\ &= \frac{1 - \left( .04539 + \frac{57}{60} \cdot (1.05)^{-3} \right)}{\frac{.05}{1.05}} \\ &= 2.81325 \end{aligned}$$

$$100,000 \left( \frac{.04539}{2.81325} \right) = 1613.44$$