

Question #239

Answer: B

Let P denote the annual premium

The EPV of benefits is $25,000\bar{A}_{x:\overline{20}|} = 25,000(0.4058) = 10,145$.

The EPV of premiums is $P\ddot{a}_{x:\overline{20}|} = 12.522P$

The EPV of expenses is

$$\begin{aligned} & (0.25 - 0.05)P + 0.05P\ddot{a}_{x:\overline{20}|} + \left[(2.00 - 0.50) + 0.50\ddot{a}_{x:\overline{20}|} \right] \frac{25,000}{1,000} + (15 - 3) + 3\ddot{a}_{x:\overline{20}|} \\ & = 0.20P + 0.6261P + 194.025 + 12 + 37.566 = 0.8261P + 243.591 \end{aligned}$$

Equivalence principle:

$$12.522P = 10,145 + 0.8261P + 243.591$$

$$\begin{aligned} P &= \frac{10,389.591}{12.522 - 0.8261} \\ &= 888.31 \end{aligned}$$