

Question #297

Answer: E

The recursive formula for the account values is:

$$AV_{k+1} = (AV_k + 0.95G - 50)1.06 - (100,000 - AV_{k+1})q_{50+k}.$$

This is identical to the recursive formula for benefit reserves for a 20-year term insurance where the benefit premium is $0.95G - 50$. Because the benefit reserve is zero after 20 years, using this premium will ensure that the account value is zero after 20 years. Therefore,

$$0.95G - 50 = 100,000 \frac{A_{50:\overline{20}|}^1}{\ddot{a}_{50:\overline{20}|}} = \frac{A_{50} - {}_{20}E_{50}A_{70}}{\ddot{a}_{50} - {}_{20}E_{50}\ddot{a}_{70}} = 100,000 \frac{0.24905 - 0.23047(0.51495)}{13.2668 - 0.23047(8.5693)} = 1154.55$$

$$G = (1154.55 + 50) / 0.95 = 1,267.95.$$