Question #118
Answer: D

Let $\pi =$ benefit premium

Expected present value of benefits =

$$= (0.03)(200{,}000)v + (0.97)(0.06)(150{,}000)v^2 + (0.97)(0.94)(0.09)(100{,}000)v^3$$
$$= 5660.38 + 7769.67 + 6890.08$$
$$= 20{,}320.13$$

Expected present value of benefit premiums

$$= \ddot{a}_{x:\overline{3}|}\,\pi$$
$$= \left[1 + 0.97v + (0.97)(0.94)v^2\right]\pi$$
$$= 2.7266\,\pi$$
$$\pi = \frac{20{,}320.13}{2.7266} = 7452.55$$

$$_1V = \frac{(7452.55)(1.06) - (200{,}000)(0.03)}{1 - 0.03}$$
$$= 1958.46$$

Initial reserve, year 2 = $_1V + \pi$

= 1958.56 + 7452.55

= 9411.01