

Question #287

Answer: E

The reserve at the end of year 2 is $10,000vq_{52} - \pi_3$ where π_3 is the benefit premium in year 3. From the equivalence principle at time zero:

$$10,000(vq_{50} + v^2 p_{50}q_{51} + v^3 p_{50}p_{51}q_{52}) = 0.5\pi_3 + 0.5\pi_3vp_{50} + \pi_3v^2 p_{50}p_{51}$$

$$10,000\left(\frac{0.05}{1.04} + \frac{0.95(0.06)}{1.04^2} + \frac{0.95(0.94)(0.07)}{1.04^3}\right) = \left(0.5 + 0.5\frac{0.95}{1.04} + \frac{0.95(0.94)}{1.04^2}\right)\pi_3$$

$$1563.4779 = 1.78236\pi_3$$

$$\pi_3 = 877.1953$$

$${}_2V = 10,000(0.7)/1.04 - 877.1953 = -204.12$$