Question #69
Answer: D

v is the lowest premium to ensure a zero % chance of loss in year 1 (The present value of the payment upon death is *v*, so you must collect at least *v* to avoid a loss should death occur).
Thus *v* = 0.95.

$$\mathrm{E}(\mathrm{Z}) = vq_x + v^2 p_x q_{x+1} = 0.95 \times 0.25 + (0.95)^2 \times 0.75 \times 0.2$$
$$= 0.3729$$

$$\mathrm{E}(\mathrm{Z}^2) = v^2 q_x + v^4 p_x q_{x+1} = (0.95)^2 \times 0.25 + (0.95)^4 \times 0.75 \times 0.2$$
$$= 0.3478$$

$$\mathrm{Var}(\mathrm{Z}) = \mathrm{E}(\mathrm{Z}^2) - (\mathrm{E}(\mathrm{Z}))^2 = 0.3478 - (0.3729)^2 = 0.21$$