

Question #23**Answer: D**

Let q_{64} for Michel equal the standard q_{64} plus c . We need to solve for c .

Recursion formula for a standard insurance:

$${}_{20}V_{45} = ({}_{19}V_{45} + P_{45})(1.03) - q_{64}(1 - {}_{20}V_{45})$$

Recursion formula for Michel's insurance

$${}_{20}V_{45} = ({}_{19}V_{45} + P_{45} + 0.01)(1.03) - (q_{64} + c)(1 - {}_{20}V_{45})$$

The values of ${}_{19}V_{45}$ and ${}_{20}V_{45}$ are the same in the two equations because we are told

Michel's benefit reserves are the same as for a standard insurance.

Subtract the second equation from the first to get:

$$0 = -(1.03)(0.01) + c(1 - {}_{20}V_{45})$$

$$c = \frac{(1.03)(0.01)}{(1 - {}_{20}V_{45})}$$

$$= \frac{0.0103}{1 - 0.427}$$

$$= 0.018$$