1. Using the prospective formula, the benefit reserve at the end of 10 years is given by

\[ \bar{V}_{10} (\bar{A}_{35:30}) = \bar{A}_{45:20} - 20 \bar{P} (\bar{A}_{35:30}) \cdot \bar{a}_{45:10} \]

where

\[ 20 \bar{P} (\bar{A}_{35:30}) = \frac{\bar{A}_{35:30}}{\bar{a}_{35:20}} \]

A unit benefit n-year endowment insurance pays $1 either at the time of death or at year \( n \). Since \( i = 0 \), its APV is 1. Thus this implies that

\[ \bar{A}_{35:30} = \bar{A}_{45:20} = 1 \]

Since \( \omega = 75 \) and \( i = 0 \), we also find

\[ \bar{a}_{35:20} = \int_0^{20} t p_{35} dt = \int_0^{20} \left( 1 - \frac{t}{40} \right) dt = 15 \]

\[ \bar{a}_{45:10} = \int_0^{10} t p_{45} dt = \int_0^{10} \left( 1 - \frac{t}{30} \right) dt = \frac{25}{3} \]

Therefore,

\[ \bar{V}_{10} (\bar{A}_{35:30}) = 1 - \frac{1}{15} \cdot \frac{25}{3} = \frac{4}{9} \]

2. Using the retrospective formula, the benefit reserve at the end of 5 years is given by

\[ V_5 = \bar{A}_{1:50:5} = \frac{\bar{A}_{1:50:5}}{5 E_{45}} = \bar{A}_{1:50:5} \]

Since \( i = 0 \) and \( f_{T(50)}(t) = \frac{1}{25} \),

\[ V_5 = \bar{A}_{1:50:5} = \int_0^5 \frac{1}{25} dt = \frac{1}{5} \]