Exercise 4.8

By noting that \( A_{x:20}^{1} = A_{x:20}^{1} + A_{x:20}^{1/2} \) and that \( A_{x} = A_{x:20}^{1} + A_{x:20}^{1/2} A_{x+20} \), then we have

\[
A_{x:20}^{1} = \frac{A_{x:20} - A_{x}}{1 - A_{x+20}} = \frac{0.55 - 0.25}{1 - 0.40} = \frac{0.3}{0.6} = 0.50.
\]

(a) Based on claims acceleration, we have

\[
10000 \, \bar{A}_{x:20}^{1} = 10000 \left[ (1 + i)^{1/2} A_{x:20}^{1/2} + A_{x:20}^{1/2} \right] = 10000 \left[ 1.03^{1/2}(0.05) + 0.50 \right] = 5,507.445.
\]

(b) Based on UDD, we have

\[
10000 \, \bar{A}_{x:20}^{1} = 10000 \left[ \frac{i}{\delta} A_{x:20}^{1} + A_{x:20}^{1} \right] = 10000 \left[ \frac{0.03}{\log(1.03)}(0.05) + 0.50 \right] = 5,507.463.
\]