Exercise 9.7

Since this is a reversionary annuity payable to (y) following the death of (x), then in the case where (x) dies before (y) so that $T_x < T_y$, the present value of the annuity payments will be

$$\bar{a}_{\overline{T_y}|} - \bar{a}_{\overline{T_x}|}$$

which is equivalent to

$$\bar{a}_{\overline{T_y}|} - \bar{a}_{\overline{T_{xy}}|}$$

since in this case $T_{xy} = \min(T_x, T_y) = T_x$. On the other hand, if (x) outlives (y), then the present value of the annuity payments will be zero:

$$\bar{a}_{\overline{T_y}|} - \bar{a}_{\overline{T_{xy}}|} = \bar{a}_{\overline{T_y}|} - \bar{a}_{\overline{T_y}|} = 0$$

Here in this case, we clearly have $T_{xy} = \min(T_x, T_y) = T_y$.