

A life aged x purchases an annuity of A per annum payable continuously for life and after his death for a further period of 10 years but only for as long as another life aged y is alive. After that period expires and if the life aged y is still alive the annuity becomes $\frac{A}{2}$ and continues to be paid till his death. The force of interest is r , the life aged x follows a force of mortality μ_{x+t} ; the life aged x is impaired and it follows a force of mortality $\mu_{y+t} + c$.

1. Explain how you would calculate the price of the annuity using only annuities based on μ of the form \bar{a}_{wz} and \bar{a}_w at any interest rates and any survival functions based on μ .
2. Explain how you would calculate the probability that x dies before y and the probability that y dies more than 10 years after x again using only annuities based on μ of the form \bar{a}_{wz} and \bar{a}_w at any interest rates and any survival functions based on μ .