

Module 3 Section 6 Exercises:

1. A 60-year old purchases a 2-year deferred whole life annuity due with the following provisions:
 - (i) Premiums of 10,000 are paid at the beginning of each year for the first 2 years
 - (ii) Payments of X are received at the beginning of each year starting at age 62
 - (iii) The death benefit during the deferred period is the return of premiums without interest

Using ILT actuarial assumptions, determine X , assuming premiums were determined using the equivalence principle.

2. A 20-year deferred whole life insurance of 1000 issued to (40) with benefit paid at the end of the year of death, and premiums paid at the beginning of each year during the deferred period, has a premium refund feature that returns premiums without interest if death occurs during the deferred period. You are given:

(i) Mortality follows a DML(100) model and $i = 0.05$

(ii) $(IA)_{40:\overline{20}|} = 1.849$

(iii) $\ddot{a}_{40:\overline{20}|} = 11.362$

Determine the annual premium using the equivalence principle.

3. Billy and Bob are each 30-years old, and each purchases a fully discrete 10-payment whole life insurance of 1000 with level annual net premiums. Billy's contract also has a premium refund feature whereby in addition to the 1000, the death benefit includes the refund, without interest, of all net premiums paid. You are given:

(i) $A_{30} = 0.102$

(ii) ${}_{10|}A_{30} = 0.088$

(iii) $(IA)_{30:\overline{10}|} = 0.078$

(iv) $\ddot{a}_{30:\overline{10}|} = 7.747$

(v) Billy's annual net premium is X . Bob's annual net premium is Y .

Determine $X - Y$.