

Show all work for full credit, use correct notation, and clearly mark your answer.

1. A fully discrete whole life insurance of 5000 issued to (35) has annual premiums of π . Using ILT actuarial assumptions, the reserve at time 15 is 781. Determine π .
2. Using ILT actuarial assumptions, determine the net premium reserve at time 20 for a fully discrete 30-year endowment insurance of 1000 issued to (30).
3. For a 3-year fully discrete term insurance of 100,000 issued to (30) that has annual premiums 150, use ILT mortality and $i = .05$ to determine $Var({}_1L)$.

4. For a fully discrete whole life insurance of 10,000 issued to (30) that has annual premiums of 70, use ILT actuarial assumptions to determine $\sqrt{\text{Var}({}_{10}L)}$.

5. For a semi-continuous whole life insurance issued to (40), you are given:

- (i) A benefit of 25,000 is paid at the moment of death
- (ii) Premiums, determined by the equivalence principle, are paid at the beginning of each year.
- (iii) Mortality follows the Illustrative Life Table
- (iv) $i = 0.06$
- (v) There is a uniform distribution of deaths between integer ages.

Determine the reserve at the end of year 10.