

Each problem is worth 10 points. Show all work for full credit, and use correct notation. Unless implied or told otherwise, premiums are level.

- Each of 5,000 independent lives age 20 purchases a fully discrete whole life insurance of 10,000. Using *SULT* actuarial assumptions and the normal approximation, determine the annual premium each pays such that the probability of a total loss is 5%. Note that the 95th percentile of the standard normal distribution is 1.645.
- A 4-year fully discrete term insurance issued to (40) has a death benefit of 1000 in each year. Annual premiums are 20. Using $d = 0.05$, determine the value of ${}_1L|K_{40} = 2$.

3. Given a fully continuous whole life insurance of 5000 issued to (x) , determine the annual premium rate such that there is a 90% probability that there is a gain at issue on the policy. Assume $CF(\mu = 0.01, \delta = 0.04)$ actuarial assumptions.
4. A fully continuous whole life insurance of 3000 issued to (x) has an annual premium rate of 80 that's payable for a maximum of 10 years. Using $CF(\mu = .01, \delta = .04)$, Determine $Var({}_{10}L)$.
5. For a fully discrete whole life insurance of 10,000 issued to (20) , annual premiums are determined by the equivalence principle. Determine the time 5 reserve, ${}_5V$. Use the SULT for all calculations.