

MA (ST) 412 Supplement to 6.3

1. A fully discrete whole life insurance of 1 is issued to (30) with annual premiums determined by the equivalence principle. If the mortality follows:  $s(x) = 1 - \frac{x}{100}, 0 \leq x \leq 100$ , and  $v = 0.95$ , calculate the probability that the insurer will not sustain a loss.
2. For a fully discrete whole life insurance on  $(x)$ , you are given
  - $d = 0.04, A_x = 0.5, {}^2A_x = 0.3$ .
  - Annual premium is 0.05 times the amount of insurance.

Calculate  $E[L]$  and  $Var(L)$ , where  $L$  is the loss-at-issue random variable for a policy of amount 1.

3. A company sells the whole life insurance in problem 2 (the previous problem). It issues 135 policies of amount 1, and 10 policies of amount 3. Assume that losses are independent. Use the normal approximation to calculate the probability that the present value at issue of the insurer's total gain on these policies will exceed 45.