Module 4 Section 5 Exercises:

1. For a fully discrete 2-year endowment insurance on (x), you are given

   (i)   the death benefit is 3000 in year 1 and 2000 in year 2

   (ii)   the maturity benefit is 1000

   (iii) expenses, payable at the beginning of the year are:
           (a) taxes are 2% of the gross premium
           (b) commissions are 3% of the gross premium
           (c) other expenses are 15 in the first year and 2 in the second year

   (iv) $i = 0.04$, $p_x = 0.9$, and $p_{x+1} = 0.8$

   (v)   using the equivalence principle, the annual gross premium is 735.68

   (vi)   the annual net premium is 689.93

   Determine

   (a)   the acquisition expense
   (b)   the gross premium reserve at time 1
   (c)   the net premium reserve at time 1
   (d)   the deferred acquisition cost at time 1 (i.e. the expense reserve at time 1)

2. Redo Number 1 with the expenses in part (iii)(c) equal to 2 in each year. Note that this changes the annual gross premium using the equivalence principle to 728.35.

3. For a fully continuous whole life insurance of 1 on (x), you are given:

   (i) $\mu = 0.04$ and $\delta = 0.06$

   (ii)   the annual gross premium (rate), payable continuously for a maximum of 10 years, is 0.072

   (iii) expenses are

       (a) 0.02 initial expense
       (b) 0.003 per year, payable continuously for the lifetime of (x)

   Determine the gross premium reserve at time 5.

4. For a fully discrete whole life insurance of 10,000 issued to (40), use ILT actuarial assumption to determine the full preliminary term reserve at age 60, $_{20}V^{FPT}$.

5. For a fully discrete 11-year term insurance of 50,000 issued to (39), use ILT actuarial assumptions to determine $_{6}V^{FPT}$.