6.1 Consider a fully discrete whole life insurance with sum insured $200,000 issued to a select life aged 30. The premium payment term is 20 years. Assume the mortality follows the Standard Select Life Table with $i = 5\%$.
   a) Write down an expression for the net loss at issue random variable
   b) Calculate the annual premium.
   c) Calculate the probability that the contract makes a profit

6.2 Consider a five-year term insurance issued to a select life aged 40 by a single premium, with sum insured $1 million payable immediately on death. Assume mortality follows the Standard Select Life Table with UDD between integer ages, $i = 5\%$.
   a) Write down an expression for the net loss at issue random variable
   b) Calculate the annual premium.
   c) Calculate the probability that the contract makes a profit

6.3 You are given the following extract from a select life table with a four-year select period. A select individual aged 41 purchased a three-year term insurance with a net premium of $350 payable annually. The sum insured is paid at the end of the year of death.

$[x]$	$l_{[x]}$	$l_{[x]+1}$	$l_{[x]+2}$	$l_{[x]+3}$	l_{x+4}	$x+4$
[40]	100 000	99 899	99 724	99 520	99 288	44
[41]	99 802	99 689	99 502	99 283	99 033	45
[42]	99 597	99 471	99 628	99 030	98 752	46

Use an effective rate of interest of 6% per year to calculate@
   (a) the sum insured, assuming the equivalence principle,
   (b) the standard deviation of L_0, and
   (c) $\Pr[L_0 > 0]$.

6.5 Consider a 10-year annual premium term insurance issued to a select life aged 50, with sum insured $100 000 payable at the end of the year of death.
   (a) Write down an expression for the net future loss random variable.
   (b) Calculate the net annual premium.

6.6 A select life aged 45 purchases a fully discrete 20-year endowment insurance with sum insured $100 000. Calculate the annual premium using the following assumptions:
   i) Commission is 10% of the first premium and 2% of each subsequent premium.
   ii) Other expenses are $50 at issue and $8 at each subsequent date.
   Mortality follows Standard Select Table and $i = 5\%$.

6.7 Determine the annual premium for a 20-year term insurance with sum insured $100 000 payable at the end of the year of death, issued to a select life

aged 40 with premiums payable for at most 10 years, with expenses, which are incurred at the beginning of each policy year, as follows:

	Year 1		Years 2+	
	% of premium	Constant	% of premium	Constant
Taxes	4%	0	4%	0
Sales commission	25%	0	5%	0
Policy maintenance	0%	10	0%	5

Assume that mortality follows the Standard Select Life Table and $i = 5\%$

6.8 A fully discrete whole life insurance with unit sum insured is issued to (x). Let L_0 denote the net future loss random variable with the premium determined by the equivalence principle. You are given that $V[L_0] = 0.75$. Let L_0^* denote the net future loss random variable with the premium determined such that $E[L_0^*] = -0.5$. Calculate $V[L_0^*]$.

6.9 A life insurance company issues a 10-year term insurance policy to a life aged 50, with sum insured $\$100,000$. Level premiums are paid monthly in advance throughout the term. You are given the following premium assumptions.
  i) Commission is initial 20% of each premium payment in the first year, and 5% of all premiums after the first year.
  ii) Additional initial expenses $\$250$.
  iii) Claim expenses are $\$250$
  iv) The sum insured and claim expenses are payable one month after the date of death.
  Mortality follows the Standard Select Life Table with UDD between integer ages. and $i = 5\%$.
  Calculate the gross monthly premium.