

MA (ST) 412 Supplement to 5.3

Note: from *Actuarial Mathematics*.

1. Y is the present value of a whole life annuity-due of 1 issued to (x) .

You are given

(a) $\ddot{a}_x = 10$;

(b) ${}^2\ddot{a}_x = 6$;

(c) $i = 1/24$.

Calculate $Var(Y)$.

2. You are given:

k	$\ddot{a}_{\overline{k+1} }$	${}_k q_x$
0	1.00	0.33
1	1.93	0.24
2	2.80	0.16
3	3.62	0.11

Calculate $\ddot{a}_{x:\overline{4}|}$.

3. Each of the following life annuities is issued to a life age 25. Write an expression for the present value of the payments actually made if death occurs at age 30.7.

(a) whole life annuity-due of 1 per year

(b) 5-year temporary life annuity-due of 1 per year

(c) 2-year deferred whole life annuity-due of 1 per year

(d) 10-year certain and whole life annuity-due of 1 per year

4. A 10-year deferred whole life annuity-due of 1 per year is issued to (50) . You are given that mortality follows De Moivre's Law ($\mu(t) = \omega - t$) with $\omega = 100$ and $i = 0$.

(a) Calculate the actuarial present value of the annuity

(b) Determine the probability that the sum of the payments made under the annuity will exceed the actuarial present value.