MAP 4176 / 5178 Name:_____
Test 9 Date: March 13, 2018

Each problem is worth 10 points. Show all work for full credit, and use correct notation.

1. For a fully discrete whole life insurance of 1000 issued to (20) with annual premiums of 3, use SULT actuarial assumptions to determine the variance of the loss-at-issue present value random variable.

2. For a fully discrete whole life insurance of 1000 issued to (20) with annual premiums determined by the equivalence principle, use SULT actuarial assumptions to determine the variance of the loss-at-issue present value random variable.

3. For an insurance issued to independent lives (x) and (y), a benefit of 10,000 is paid at the moment of the second death. Premiums are paid continuously at an annual rate of π until the first death. Using $CF\left(\mu_x = 0.01, \mu_y = 0.02, \delta = 0.03\right)$ actuarial assumptions and the equivalence principle, determine π.

4. For a fully discrete 2-year term insurance issued to (x), you are given:

   i) the death benefit is 3000 in the first year and 5000 in the second year
   ii) $d = 0.05$
   iii) $q_x = 0.05$ and ${}_{1|}q_x = 0.04$

   Determine the net annual premium.

5. For a fully discrete whole life insurance of 10,000 issued to (x) with annual premiums of 75, using $i = 0.05$, determine the minimum value of the curtate future lifetime random variable, K, such that the value of the loss-at-issue present value random variable is negative.