(New) Module 2 Section 5 Exercises:

1. Given $\bar{A}_x = 0.5$, $\bar{A}_{x+n} = 0.6$, and ${}_nE_x = 0.55$, determine $\bar{A}_{x:\overline{n}|}$.

   For Numbers 2 through 4, determine the APV of the insurance product using the following assumptions:

   (a) DML(100) and $\delta = .05$ actuarial assumptions
   (b) CF with $\mu = .03$ and $\delta = .05$ actuarial assumptions
   (Note that ages matter for part (a), but not for part (b).)

2. a whole life insurance of 5000, issued to (60), payable at the moment of death

3. a continuous 20-year deferred whole life insurance of 1000 issue to a 60 year old

4. a 20-year endowment insurance of 3000 issued to (60), with death benefit paid at the moment of death

5. Determine an expression using single life and joint life statuses for the actuarial present value of a continuous insurance, based on independent lives (x) and (y), with death benefit as follows:
   if (x) dies first, 5 is paid when (x) dies and 20 is paid when (y) dies
   if (y) dies first, 10 is paid when (x) dies and 15 is paid when (y) dies

6. A 10-year term insurance of 100,000 issued to (x), with benefit payable at the moment of death, has a double indemnity clause stating that an additional 50,000 will be paid if death occurs by accidental means. Given $\mu_x^{(\text{accident})} = .005$, $\mu_x^{(\text{non-accident})} = .02$ and $\delta = .05$, determine the APV of the insurance.

   For Numbers 7 and 8, determine the APV of the insurance product described, using
   (a) ILT actuarial assumptions and the UDD assumption between integer ages
   (b) ILT actuarial assumptions and the claims acceleration approach

7. A whole life insurance issued to (40) with a benefit of 1000 payable at the moment of death

8. A 20-year endowment insurance issued to (40) with a benefit of 1000 payable at the moment of death