L-TAM Module 1 Section 1 Exercises

1. Given ${}_{20}q_{50} = .75$, determine ${}_{20}p_{50}$

2. Given $p_{30} = .95$, determine q_{30}

3. Given ${}_{10}p_{20} = .9$ and ${}_{20}p_{30} = .6$, determine ${}_{30}p_{20}$

4. Given ${}_{20}p_{40} = .7$ and ${}_{5}p_{40} = .9$, determine ${}_{15}p_{45}$

5. Given ${}_{35}p_{35} = .32$ and ${}_{20}p_{50} = .4$, determine ${}_{15}q_{35}$

6. Given ${}_{30}p_{20} = \frac{5}{8}$, ${}_{10}p_{60} = \frac{3}{4}$, ${}_{10}q_{20} = \frac{1}{8}$, and ${}_{20}q_{50} = \frac{2}{5}$ determine ${}_{30}q_{30}$

7. Given $p_x = e^{-\mu}$, $p_{x+1} = e^{-3\mu}$, and ${}_{2}p_{x} = .1$, determine μ

8. Given ${}_{t}p_{0} = 1 - (.01t)^2$, $0 \le t \le 100$, determine

(a) ${}_{20}p_{30}$ (Hint: Use factorization and the values of ${}_{30}p_{0}$ and ${}_{50}p_{0}$)
(b) ${}_{t}p_{30}$ (Your answer will be an expression involving *t*.)

9. Given

x	q_x
30	0.1
31	0.2
32	0.3
33	0.4
34	0.5
35	0.6
36	0.7
37	0.8

determine

(a) ${}_{2}q_{30}$
(b) ${}_{2}q_{34}$
(c) ${}_{3}q_{30}$
(d) ${}_{3}q_{34}$

10. Given ${}_{20}p_{40} = .63$ and ${}_{15}p_{45} = .7$, determine ${}_{5|15}q_{40}$

11. Given ${}_{10|20}q_{30} = .2$ and ${}_{10}q_{30} = .15$, determine ${}_{30}p_{30}$

12. Given ${}_{30|20}q_{40} = .19$ and ${}_{30}p_{40} = .2$, determine ${}_{20}q_{70}$

13. Given ${}_{k|}q_x = .01(k+1)$ for $k = 0,1,2,\ldots,9$, determine ${}_{10}p_x$

14. Given $\int_0^{30} f_{40}(t)dt = 1/2$ and $\int_{10}^{\infty} f_{40}(t)dt = 5/6$, determine ${}_{10|20}q_{40}$

15. Given ${}_{15|20}q_{25} = .18$ and ${}_{15}q_{25} = .1$, determine $\int_{20}^{\infty} f_{40}(t)dt$

16. Given ${}_{k|}q_{40} = \frac{1}{50}$ for $k = 0,1,2,\ldots,49$, determine

(a) $E[Min(K_{40}, 2)]$
(b) $Var[Min(K_{40}, 2)]$

17. Given $q_{x+k} = .1(k+1)$ for $k = 0,1,2,\ldots,9$, determine

(a) q_x
(b) ${}_{1|}q_x$
(c) ${}_{2|}q_x$
(d) ${}_{3}p_x$

18. Using mortality in the previous problems, determine $Var(Min(K_x, 3))$

19. Given

K_{90}	Pr
0	.2
1	.3
2	.5

determine

(a) e_{90}
(b) $Var(K_{90})$

20. Given ${}_{k|}q_{20} = \frac{1}{80}$ for $k = 0,1,2,\ldots,79$, determine e_{20}

21. Given ${}_{t}p_x = (.91)^t$, determine e_{20}

22. Given ${}_{t}p_x = e^{-.05t}$, determine $\overset{o}{e}_x$

23. Given ${}_{t}q_{20} = \frac{t}{80}$, $0 \le t \le 80$, determine $\overset{o}{e}_{20}$

24. Given $e_{50} = 25$ and $p_{50} = .98$, determine e_{51}

25. Given $e_{61} = 10$ and $p_{60} = .95$, determine e_{60}

26. Given $e_{30} = 34.5$, $p_{30} = \frac{69}{70}$, and $p_{31} = \frac{68}{69}$, determine e_{32}

27. Given $e_x = 4.5$, $e_{x+2} = 3.5$, and $p_{x+1} = \frac{8}{9}$, determine p_x

28. Create a 3-year recursion formula for e_x.