

Introduction to Demographic Methods

Session 7 Exercise

1. The following values are taken from a life table:

$q_{85} = 0.1256$
 $q_{86} = 0.1375$
 $q_{87} = 0.1498$
 $q_{88} = 0.1616$
 $q_{89} = 0.1729$

Check the correct probability of surviving to exact age 90:

0.24 0.34 0.44

Check the correct probability of dying before reaching exact age 90 for those who survive to exact age 85:

0.46 0.56 0.66

2. From a life table the following figures have been taken:

$e_{20} = 45.20$ years $l_{20} = 91,940$
 $e_{25} = 40.52$ years $l_{25} = 91,232$

How many people are in age group 20-25?

351 201,327 458,967

How many people die in the age interval?

708 808 1008

Is the distribution of death $f(x)$ increasing or decreasing in this age interval?

Increasing Decreasing

3. Check the correct answer:

In a stationary population 87% of those born reach age 20 and 85% reach age 25. If the percentage of people in the age group 20-25 is 7% what is the expectation of life at birth for this population? (assume that deaths occur uniformly in this interval)

41 55 61

4. Fill in the blanks to complete the following life table for United States 1959-61:

Abridged Life Table for the Total population of the United States: 1959-61						
Age Interval						
(exact ages)						
x to x+n	nq_x	l_x	ndx	nL_x	T_x	$e^{\circ}x$
0-1	0.02593	100,000	2,593	97,815	6,989,030	
1-5	0.00420	97,407	409	388,649		70.75
5-10		96,998	233	484,361	6,502,566	67.04
10-15	0.00221	96,765	214		6,018,205	62.19
15-20	0.00456		440	481,746	5,534,863	57.33

20-25	0.00618	96,111	594	479,098		52.58
25-30	0.00641	95,517		476,075	4,574,019	47.89
30-35		94,905	761	472,709	4,097,944	43.18
35-40	0.01147	94,144	1,080		3,625,235	38.51
40-45	0.01812	93,064	1,686	461,407	3,157,035	
45-50	0.02869		2,622	450,814	2,695,628	29.50
50-55	0.04557	88,756		434,264	2,244,814	25.29
55-60	0.06663	84,711	5,644	410,224		21.37
60-65	0.10017	79,067	7,920	376,487	1,400,326	
65-70		71,147	10,290	330,985	1,023,839	14.39
70-75	0.20847	60,857	12,687		692,854	11.38
75-80	0.30297		14,594	204,984	419,370	8.71
80-85	0.44776	33,576		129,532	214,386	6.39
85 and over	1.00000	18,542	18,542	84,854	84,854	4.58
Adapted from Shryock, Siegel and Stockwell. 1976						

Check the correct answer for the following (assume that both sexes follow mortality of this common life table):

a) The probability that a woman just entering her childbearing years (age 15) will die before the end of her reproductive life (age 50)?

0.06 0.07 0.08

b) The probability that a newborn child will die during the childbearing years?

0.06 0.07 0.08

c) What will be the average age at death of persons of exact age 50 who will die between ages 50 and 75?

65.1 65.3 65.5

5. Which of the following are true [T] and which are false [F]?

	T	F
A journalist writing a series on Health in the White House noted that the average age of natural death of presidents of the U.S. was higher than that of the average population. From this he concluded that mortality in the U.S. presidents was lower than that of the average U.S. citizen. Is his conclusion true?		
If one used the life table stationary population as a standard for a nation, the adjusted and crude death rates would be identical		
The actuarial method of life table construction assumes deaths are constant throughout the age interval		
The expectation of life declines uniformly from age 0 onward		
One can reconstruct an entire abridged life table if you are given the ex function		

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Session 7 Answers

1.

0.44
0.56

2.

458 967
708
Increasing

3. 61

4.

nq_x : 0.00240; 0.00802; 0.14463
 l_x : 96 551; 91 378; 48 170
 nd_x : 612; 4 045; 15 034
 nL_x : 483 342; 468 200; 273 484
 T_x : 6 891 215; 5 053 117; 1 810 550
 e°_x : 69.89; 33.92; 17.71

a) 0.08
b) 0.08
c) 65.3

5. T, F, T, F, F