PCB-3043 – Fall 2016
Assignment 2
HEADSTONE PROJECT

With this data base, do the following:

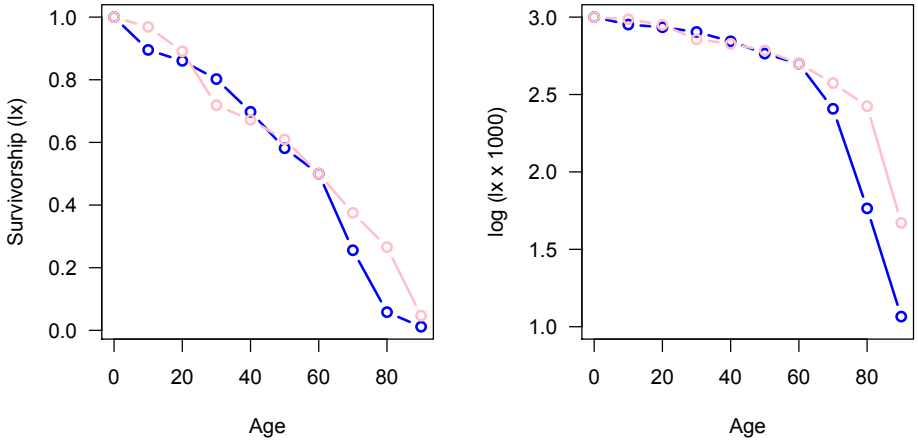
1. (16 pts.) Divide the data into the following age classes: 0-9, 10-19, 20-29, etc. in 10 year groups. Therefore, if someone was born in 1855 and died in 1865, we will assume that they lived for 10+ years and belong in the 10-19 age class.

   a. (4 pts.) Use this data to construct a table with age classes and a separate lx for each sex and each age class.

x	num.fem	lx.fem	num.males	lx.male
0	64	1	86	1.00
10	62	0.97	77	0.90
20	57	0.89	74	0.86
30	46	0.72	69	0.80
40	43	0.67	60	0.70
50	39	0.61	50	0.58
60	32	0.50	43	0.50
70	24	0.38	22	0.26
80	17	0.27	4	0.05
90	3	0.05	1	0.01
100	0	0.00	0	0.00
110	0	0.00	0	0.00

   b. (6 pts.) Construct a graph showing separate survivorship curves for each gender on the same graph. Label the axes clearly.

   The curve should look like either the log curve (right) or regular curve (left), shown below.



c. (3 pts.) Are these type I, II, or III survivorship curves? How do you know?

Clearly, this is a type I survivorship curve. You can either (1) use a log plot and say they know by shape or (2) explain that the proportion of individuals surviving decreases older ages.

d. (3 pts.) Note and explain the 3 major differences between the male and female survivorship curves.

Both graphs show that (1) females survive better until age of childbirth, then (2) a dramatic decline in female survival brings their line down. Ultimately, (3) the lines cross again at 38 or so, as female survivorship becomes greater once again. Or, put another way, (4) females tend to live longer.

2. I cannot get age specific birth rates from cemetery data. I have used other records* to estimate m_x and obtain the following:

age	m_x	x
0-9	0.0	0
10-19	0.086	10
20-29	0.561	20
30-39	0.528	30
40-49	0.142	40
50 +	0.0	--

For simplicity, we are going to just use the survivorship for women and assume it reflects the entire population.

You don't need to show your work here --. however, this is what I found:

x	num.fem	lx.fem	mx	lxmx	xlxmx
0	64	1	0	0.000	0.000
10	62	0.97	0.086	0.083	0.833
20	57	0.89	0.561	0.500	9.993
30	46	0.72	0.528	0.380	11.385
40	43	0.67	0.142	0.095	3.816
50	39	0.61	0	0.000	0.000
60	32	0.50	0	0.000	0.000
70	24	0.38	0	0.000	0.000
80	17	0.27	0	0.000	0.000
90	3	0.05	0	0.000	0.000
100	0	0.00	0	0.000	0.000
110	0	0.00	0	0.000	0.000

a. (6 pts) Use the female's l_x with the m_x above to determine R_0, G, and r for this population ($r = \ln(R_o)/G$). Show your work.

$R_0 = \Sigma(l_x m_x) =$	1.058
$G = \Sigma(x l_x m_x)/R_0$	24.604
r =	0.002286142

b. (3 pts) Is the population increasing or decreasing? Explain the basis for your answer. What assumptions are you making to say if it will increase or decrease?

The population is slightly growing – you could say it was near stable and we would accept this as a correct answer. The assumption is that you must assume a stable age distribution.