Final Exam

Demography Camp

Summer 2013

This is a 1.5 hour closed book exam. Use the exam books provided for all answers. You may use a calculator. State all assumptions.

Question 1

Given the following life table values:

Age	n	l_x	${}_nd_x$	${}_nL_x$	T_x	e_x
20	5				5375000	67
25	5	75000	5000	350000	5000000	
30	5					

Compute:

Part A

${}_5L_{20}$

Part B

l_{30}

Part C

e_{25}

Question 2

US life expectancy at birth in 2000 was 77 years. In no more than two sentences, provide an explanation of what this means in language suitable for non-demographers.

Question 3

Suppose there are two populations (A and B) which are currently of equal size and have been growing at a constant rate of .02 and .01 respectively. If these rates persist into the future, what will be the ratio of the population size of A relative to B in 50 years?

Question 4

Draw a population pyramid for a country with high fertility. Make sure to include labels! Now imagine that tomorrow the TFR dropped to replacement level (and the mortality rates do not change). Draw the population pyramid for this population 20 years after the drop in fertility.

Question 5

According to the UN the population of Mexico (in thousands) was 27,737 in 1950 and 36,964 in 1960

Part A

Compute the annual rate of growth between 1950 and 1960

Part B

Project the population to 2000 using that rate of growth

Part C

The population in 2000 was 98,872 (in thousands). What does that say about the annual rate of growth in the last half of the 20th century?

Question 6

Life expectancy is usually a better summary of mortality than crude death rates. Can you think of a situation when it makes no difference which one you use?

Question 7

Once upon a time, the total fertility rate in a certain country was 6.4 children per woman, which was 2.5 times the level needed for replacement. Approximately what proportion of newborn girls survived to the mean age of childbearing?

Question 8

Here's part of an abridged life table for males in rural India in 1957-1958. Note the wide age interval after 5 years.

Age	${}_nq_x$	l_x	${}_nL_x$	T_x
0		100000	89724	
1	0.15764	84642		4301832
5	0.05373		696511	3988669
15	0.1267	67468	1913868	
45	0.36845	58920		1378290
65	0.53604		274453	367668
75+	1	17264	93215	

Part A

Whats the probability of dying before age one?

Part B

Calculate the mean age at death of children dying before age one (no assumptions needed).

Part C

Estimate the expectation of life at birth.

Part D

What is the probability of surviving to age 65?

Part E

How much longer would you expect a 65 year old to live?

Part F

Calculate the probability that a newborn will die between ages 15 and 65.

Part G

What is the mortality rate for age group 75+?

Question 9

Back in 1950, the crude death rates (CDR) for Sweden and Japan were very similar, 10.0 and 10.9, respectively.

Part A

The direct standardization rate for Japan using the Swedish age distribution as the standard was 15.7. Explain what this estimate means.

Part B

Summarize in a few sentances what these results say about the age distributions and the mortality levels in the two countries

Question 10

In what way(s) is the General Fertility Rate a better measure of fertility levels than the Crude Birth Rate? What are the limitations to using GFR (name at least 2)?

Question 11

In a time when marriage and childbearing are being delayed, what are the limitations on using the period TFR to gauge trends in cohort TFR?

Question 12

What value must the period NRR have if period TFR is at replacement? Why?

Question 13

Suppose the following age-specific fertility rates are detected for a given calendar year:

Ages	Rate
14-18	0.005
19-20	0.015
21-29	0.085
30-34	0.04
35-49	0.002

What is the period TFR for these data?

Question 14

How many females may we expect in the age group 20-24 at time t=5 who are survivors of women in the population at time t=0? Just show the formula(s) you would use.

Question 15

You are given a female population (in 5 year age groups), a female life table, and age specific fertility rates for a population in 2010. List the steps you would need to take and the assumptions you would need to make to predict the number of females under age 5 in 2015.