Homework 3: due 3/8/17

The first three problems are from Chapter 7, based on hypothesis testing methods.

1. In a study of the effectiveness of a combined drug regimen for the treatment of rheumatoid arthritis, 40 white patients were followed for a period ranging from 1 to 18 years. During the course of the study, 9 patients died. The ages at entry into the study and at death for these 9 patients were as follows: Female deaths: (66, 74), (60, 76), (70, 77), (71, 81) Male deaths: (50, 59), (60, 66), (51, 69), (69, 71), (58, 71) For the 31 patients still alive at the end of the study their ages at entry and last follow-up were as follows: Female Survivors: (50, 68), (55, 72), (56, 60), (45, 55), (48, 51), (44, 55), (33, 51), (44, 50), (60, 70), (55, 60), (60, 72), (77, 80), (70, 75), (66, 70), (59, 63), (62, 63) Male Survivors: (53, 68), (55, 62), (56, 63), (45, 51), (48, 61), (49, 55), (43, 51), (44, 54), (61, 70), (45, 60), (63, 72), (74, 80), (70, 76), (66, 72), (54, 70) Using the all-cause U.S. mortality table for 1989 (Table 2.1) test the hypothesis that the death rate of these rheumatoid arthritis patients is not different from that in the general population using the log-rank test.

2. In section 1.11, data from a study of the effect of ploidy on survival for patients with tumors of the tongue was reported. (a) Test the hypothesis that the survival rates of patients with cancer of the tongue are the same for patients with aneuploid and diploid tumors using the log-rank test. (b) If primary interest is in detecting differences in survival rates between the two types of cancers which occur soon after the diagnosis of the cancer, repeat part a using a more appropriate test statistic.

3. Using the data on laryngeal cancers in Example 7.6, test, by the log-rank statistic, the null hypothesis of no difference in death rates among the four stages of cancer against the global alternative that at least one of the death rates differs from the others. Compare your results to those found in Example 7.6.

4. Using the data $1.1, 2.1, 2.4, 3.5$, find the Kernel density estimate for $f(2)$ using the following kernals:

(a) Normal kernel with bandwidth 1 and 2

(b) Rectangular kernel, $K(x) = 1/2$ for $-1 \leq x \leq 1$ for bandwidth 1 and 2.

(c) Epanechnikov kernel, $K(x) = 0.75(1-x^2) for -1 \leq x \leq 1$ for bandwidth 1 and 2.