MAP 4175 / 5177   Name:_____
Tests 6 and 7 (Due October 18 in class)   Date: October 17, 2018

Show all work for full credit, and use correct notation. Simplify answers completely.

Numbers 1 – 3:
For a mortality study on 10 dragons, you are given the following times for death:

| 2 | 3 | 3 | 6 | 8 | 12 | 18 | 18 | 18 | 23 |

1. (5 points) Determine the empirical estimate for $S(15)$.

2. (10 points) Approximate the variance of the empirical estimator for $S(15)$.

3. (5 points) Determine an 80% linear symmetric confidence interval for $S(15)$ based on the empirical estimator.

Numbers 3 and 4:
For insurance payments to 200 insureds, you are given:

Payment Range	Number of Payments
0 – 5,000	80
5,000 – 25,000	40
25,000 – 100,000	60
Over 100,000	20

4. (10 points) Use the ogive to determine the probability that a randomly selected insurance payment is less than 100,000.

5. (10 points) Use the ogive to determine the probability that a randomly selected insurance payment is greater than 50,000.

Numbers 6 – 9:
You are given the following data: (Dashes indicate missing values that must be deduced.)

i	y_i	s_i	b_i	r_i
1	3	3	6	50
2	5	7	4	-
3	7	5	2	-
4	11	5	3	-
5	16	6	4	-
6	20	2	3	-

6. (10 points) Compute the Kaplan-Meier estimates $S_{50}(11)$ and $H_{50}(11)$.

7. (10 points) Compute the Nelson-Aalen estimates $\hat{S}(11)$ and $\hat{H}(11)$.

8. (5 points each) Approximate the variance of the estimator for $S(11)$ using
   (a) Greenwood's Formula
   (b) Klein's Formula
   (c) Aalen's Formula

9. (5 points each) Approximate $S(25)$ using the Kaplan-Meier estimate $S_{50}(20)$, and
   (a) Efron's tail correction
   (b) the Klein and Moeschberger tail correction with $\omega = 30$
   (c) the exponential tail correction of Brown, Hollander, and Kowar

Number 10
A mortality study starts with 100 dragons at time 0. You are given:

Time Interval	New Entrants	Withdrawals	Deaths
(0,2]	10	30	8
(2,5]	30	10	20
(5,9]	30	10	30
(9,10]	10	30	42

Deaths occur at the midpoint of each interval
60% of new entrants arrive during the first half of the interval; 40% in the second
40% of withdrawals depart during the first half of the interval; 60% in the second

10. (10 points) Determine the Kaplan-Meier estimate for $S(9)$.