

Survival Data Analysis & Lab.

Solution #1

1. In a survival analysis, the outcome variable is dichotomous. (True / False) **False: the outcome is continuous; time until an event occurs.**
2. In a survival analysis, the event is usually described by a (0,1) variable. (True / False) **True**
3. If the study ends before an individual has gotten the event, then his or her survival time is censored. (True / False) **True**
4. If, for a given individual, the event occurs **before** the person is lost to follow-up or withdraw from the study, then this person's survival time is censored. (True / False) **False: the person fails, i.e., is not censored.**
5. $S(t) = P(T > t)$ is called the hazard function. (True / False) **False: $S(t)$ is the survivor function.**
6. The hazard function is a probability. (True / False) **False: the hazard is a rate, not a probability.**
7. Theoretically, the graph of a survivor function is a smooth curve that decreases from $S(t) = 1$ at $t = 0$ to $S(t) = 0$ at $t = \infty$. (True / False) **True**
8. The survivor function at time t gives the instantaneous potential per unit time for a failure to occur, given survival up to time t . (True / False) **False: the hazard function gives instantaneous potential.**
9. The formula for a hazard function involves a conditional probability as one of its components. (True / False) **True**
10. The hazard function theoretically has no upper bound. (True / False) **True**
11. Mathematical models for survival analysis are frequently written in terms of a hazard function. (True / False) **True**
12. One goal of a survival analysis is to compare survivor and/or hazard functions. (True / False) **True**
13. Ordered failure times are censored data. (True / False) **False: ordered failure times are data for persons who are failure.**
14. Censored data are used in the analysis of survival data up to the time interval of censorship. (True / False) **True**
15. A typical goal of a survival analysis involving several explanatory variables is to obtain an adjusted measure of effect. (True / False) **True**
16. Given the following survival time data (in weeks) for $n = 15$ subjects,

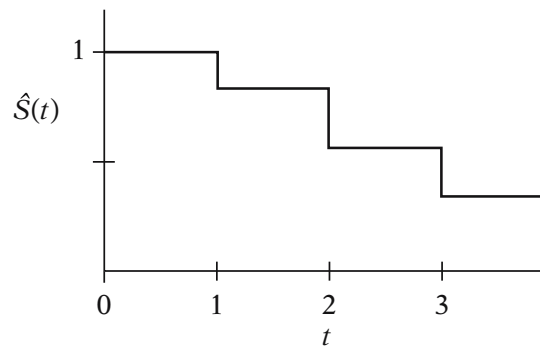
1, 1, 1+, 1+, 1+, 2, 2, 2, 2+, 2+, 3, 3, 3+, 4+, 5+

where + denotes censored data. Complete the following table:

$t_{(j)}$	m_j	q_j	$R(t_{(j)})$
0	0	0	15 persons survive ≥ 0 weeks
1	2	3	15 persons survive ≥ 1 weeks
2	3	2	10 persons survive ≥ 2 weeks
3	2	3	5 persons survive ≥ 3 weeks

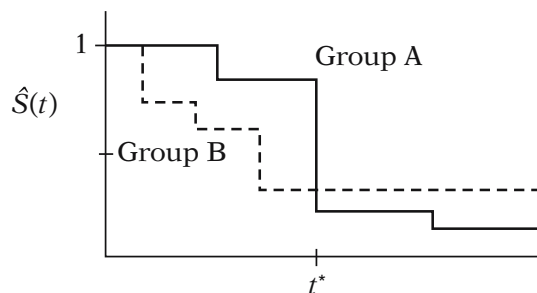
Also, compute the average survival time (\bar{T}) and the average hazard rate (\bar{h}) using the raw data (ignoring + signs for \bar{T}). $\bar{T} = 33/15 = 2.2$; $\bar{h} = 7/33 = 0.2121$

17. Suppose that the estimated survivor curve for the above table is given by the following graph:



What is the median survival time for this cohort? **Median=3 weeks**

- ♠ Questions 18–20 consider the comparison of the following two survivor curves:



18. Which group has a better survival prognosis **before** time t^* ? **Group A**
19. Which group has a better survival prognosis **after** time t^* ? **Group B**
20. Which group has a longer median survival time? **Group A**