Homework Chapter 2

Exercise 2.1 Consider the survival data given in Exercise Table 2.1 and compute and plot the estimated survivorship, the probability density and the hazard functions.

|  |  |  |  |
| --- | --- | --- | --- |
| Survival Time t (months) | | Number Survivors @ Begin | Number Dying in Interval |
| 0 | 1 | 1100 | 240 |
| 1 | 2 | 860 | 180 |
| 2 | 3 | 680 | 184 |
| 3 | 4 | 496 | 138 |
| 4 | 5 | 358 | 118 |
| 5 | 6 | 240 | 60 |
| 6 | 7 | 180 | 52 |
| 7 | 8 | 128 | 44 |
| 8 | 9 | 84 | 32 |
| 9 |  | 52 | 28 |

Exercise 2.2 Table 2.2 is a life table for the total population of 100,000 live births in the United States, 1959 – 1961. Compute and plot the estimated survivorship, the probability density, and the hazard function.

|  |  |  |  |
| --- | --- | --- | --- |
| Survival Time t (*months*) | | Number Survivors @ Begin | Number Dying in Interval |
| 0 | 1 | 100,000 | 2,593 |
| 1 | 5 | 97,407 | 409 |
| 5 | 10 | 96,998 | 233 |
| 10 | 15 | 96,765 | 214 |
| 15 | 20 | 96,551 | 440 |
| 20 | 25 | 96,111 | 594 |
| 25 | 30 | 95,517 | 612 |
| 30 | 35 | 94,905 | 761 |
| 35 | 40 | 94,144 | 1,080 |
| 40 | 45 | 93,064 | 1,686 |
| 45 | 50 | 91,378 | 2,622 |
| 50 | 55 | 88,756 | 4,045 |
| 55 | 60 | 84,711 | 5,644 |
| 60 | 65 | 79,067 | 7,920 |
| 65 | 70 | 71,147 | 10,290 |
| 70 | 75 | 60,857 | 12,687 |
| 75 | 80 | 48,170 | 14,594 |
| 80 | 85 | 33,576 | 15,034 |
| 85 |  | 18,542 | 18,542 |

Exercise 2.5: Given the survivorship function: , derive the probability density function and the hazard function.