10-Minute In-Class Quiz 1: Survival Analysis (Chapters 1–4)

Instructions

- You have **10 minutes** to complete this quiz.
- Answer all questions *concisely*.
- Show all relevant calculations where applicable.

Question 1 (4 points)

The table below shows survival data for **5 individuals** in a study. The event/censoring times and status (1: event; 0: censoring) information are given:

Time	Status
2	1
4	0
6	1
7.5	0
8	1

(a) Compute the Kaplan-Meier estimator $\widehat{S}(t)$ at times $t = 2, 6, 7.5$, and 8.

(b) Interpret $\widehat{S}(6)$ in words.

Question 2 (2 points)

The hazard function $h(t)$ is defined as:

$$\lambda(t) = \lim_{\Delta t \to 0} \frac{P(t \leq T < t + \Delta t \mid T \geq t)}{\Delta t}$$

(a) Explain what the hazard function represents in survival analysis.
(b) How is it related to the survival function $S(t)$?

Question 3 (2 points)

You fit a **Kaplan-Meier estimator** to a dataset and obtain the following estimated survival probabilities at two time points:

$$\hat{S}(3) = 0.80, \quad \hat{S}(5) = 0.65.$$

For a subject who has already survived to 3 (years), what is their probability of surviving to 5 (years)?