Name _____

Student Number _____

STA 312 s2023 Quiz 6

1. The Kapan-Meier estimate of the survival function is based on discrete time. Accordingly, let the survival time T be a discrete random variable with non-zero probability on the points $t_1, t_2, \ldots$. Let $p_j =$ the probability of surviving past time t_j, given survival to time t_{j-1}. That is, $p_j = P(T > t_j | T > t_{j-1})$.

   (a) (3 points) Prove $p_j = \frac{S(t_j)}{S(t_{j-1})}$.

   (b) (3 points) Assuming $t_0 = 0$ and $P(T > 0) = 1$ (which is very reasonable), prove $S(t_3) = p_1\, p_2\, p_3$. This is a special case of something on the formula sheet, and of course you cannot use what you are proving.

2. (4 points) In Question 12 of Assignment 6, you were asked to plot the Kaplan-Meir and maximum likelihood estimates of $S(t)$ for a small data set. Attach the plot and the R code that produced it to this quiz. On your printout, mark *the code that added the maximum likelihood estimate of* $S(t)$ the plot, and and write "Question 2" beside it. Make sure your name and student number appear on the printout and plot.