

1. Let  $X_1, X_2, \dots, X_n$  be independent identically distributed random variables with cumulative distribution function

$$F(x) = \begin{cases} 1 - e^{-x} & \text{if } x \geq 0 \\ 0 & \text{if } x < 0. \end{cases}$$

Find the cumulative distribution function of  $X_{n:n}$ .