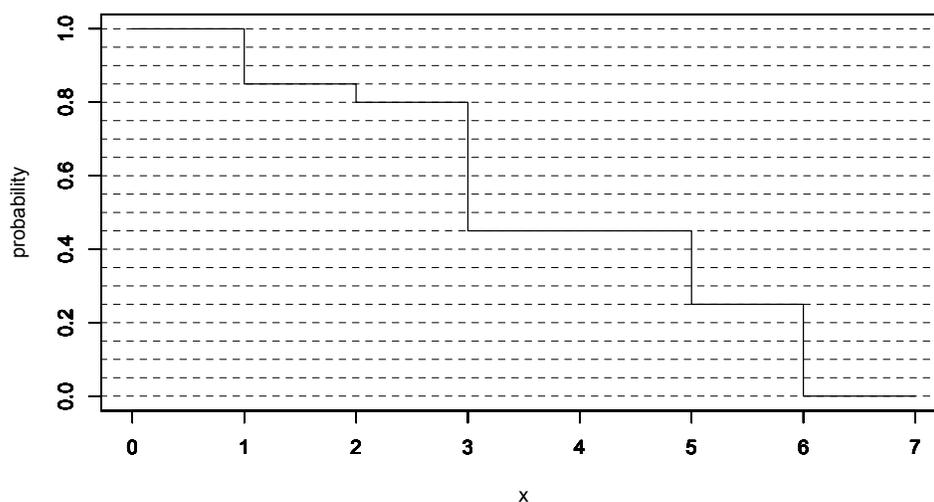


Random Variables and Distribution Functions*

Worksheet 8

1. Below is a plot of the survival function for a random variable X .



- (a) What properties of this graph guarantee that it is a survival function for a discrete random variable?
- (b) Find $P\{X = 3\}$.
- (c) Find $P\{X > 3\}$.
- (d) Find $P\{X < 3\}$.
- (e) Find the probability mass function for X
2. A Gumbel random variable X has distribution function

$$F_X(x) = \exp(-e^{-x}).$$

- (a) Give a graph of F_X and explain using this plot why F_X is a valid cumulative probability distribution function.

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- (b) Find the values of the first and third quartiles and median X and show their values on the graph.
- (c) Make a table of x and $F_X(x)$ for x equal to the integers from -2 to 5 .
- (d) Find the probabilities $P\{-1 < X \leq 4\}$ and $P\{4 < X\}$.
- (e) Find the probability density for this distribution function.
- (f) Provide a second sketch of the distribution function along with a sketch of the density function indicating $P\{-1 < X \leq 4\}$ on both plots.