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**Lecture 4 Exercise**

**1)**

**2)**

cdf(x) =

**3)** Given:

(i) Since each battery has only 2 possible outcomes (last >= 5 hours or not), and there are 3 independent trials, we’ll use Binomial distribution

(ii) Since there’re 3 batteries/trials, the state space are {0, 1, 2, 3}, meaning there can be 0 success, 1 success, and 2 and 3.

(iii)

(iv) A screen shot of a computer

AI-generated content may be incorrect.

(v) A screen shot of a graph

AI-generated content may be incorrect.

**4)**

(i) Since we model the number of grasshoppers per square meter, we should use Poisson distribution

(ii) Since Poisson counts number of occurrences, the state space should be set of non-negative integers {0, 1, 2, …}

(iii)

(iv) A screen shot of a graph

AI-generated content may be incorrect.

(v) A screen shot of a graph

AI-generated content may be incorrect.

**Bonus)**

**1)** Let H be head and T be tail.

A wins $1 if TT and $2 if HH. A loses $1 if HT or TH

> 0 => Not a fair game

**2)**

**3)**

Therefore,

(since p(x) is the probability of observing failures before a success)

**4)**

(i) p(x) = p((2 defectives + 3 good ones) and 4th good one)

(ii)