Continuous Distribution - Poisson - Exam Questions

1 Conditions

The conditions for a poisson distribution are:

- Events occur at random
- Events occur independently of each other
- The average rate of occurrences remains constant
- There is zero probability of simultaneous occurrences

2 Finding probabilities

A company has a large number of regular users logging onto its website. On average 4 users every hour fail to connect to the company's website at their first attempt.
*Find the probability that, in a randomly chosen **2 hour** period*

2.1 P(X=?)

All users connect at their first attempt

2.1.1 Method 1 - Tables

Let X be the number of failed connections

$$X \sim P_o(8)$$

Write the question in terms of inequalities (so tables can be used)

$$P(X = 0) = P(X \leqslant 0)$$

Look up the value on the tables

$$0.0002$$

2.1.2 Method 2 - Formula

Let X be the number failed connections

$$X \sim P_o(8)$$

Write down the probability to be found:

$$P(X = 0)$$

Use the formula on the data sheet:

$$e^{-\lambda}\frac{\lambda^x}{x!}$$

Substitute values:

$$e^{-8}\frac{8^0}{0!} = 0.0003$$

2.2 P(X>?) or P(X<?)

At least 4 users fail to connect at their first attempt
Let X be the number of failed connections

$$X \sim P_o(8)$$

Write down the probability to be found and rewrite in terms of less than

$$P(X \geqslant 4) = 1 - P(X \leqslant 3)$$

Look up the value on the tables

$$1 - 0.0424 = 0.9576$$