Discussion 4: Review for Midterm 1

Lectures 1 - 11

Assan Toleuov based on Slides From Zack While

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University of Massachusetts Amherst

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Preliminaries

Reminders

1. Homework #2 is due today at 4:00pm
2. Midterm 1 is in-class tomorrow: read Andrew's email about the exam details

Quiz 3 Review

Problem #4

Problem Statement

Which of the following can serve as the PMF of a random variable X?

(a) $p(X = k) = \frac{2^{(k-1)}}{2^n - 1}, k = 1, 2, ..., n$

(b) $p(X = k) = \frac{1}{k}, k = 2, 3, 4, ...$

(c) $p(X = k) = \frac{1}{k(k+1)}, k = 1, 2, ..., n$

(d) $p(X = k) = \frac{1}{2^k}, k = 1, 2, ..., n$

Problem #5

Problem Statement

A random variable X has a distribution

$p(X = k) = \frac{a}{k(k+1)}, k = 1, 2, 3, 4$

where a is a constant.

Then compute the value of $p(1 \leq X \leq 3)$.

Problem #6

Problem Statement

Suppose you toss a fair six-sided dice 5 times and let X be the number of times you did not see five or six. Then the probability that $X = c$ is

Problem #7

Problem Statement

A smartphone was purposefully dropped from a height of 10m to test its durability from external physical impact.And of course it will be damaged 100% of the time, but the damage can occur in different parts of the phone.It has been shown that c% of the damages occur in the glass screen, while the other (100-c)% occur in the battery. A number of smartphones were tested and the tests were independent. Find the probability that the first battery damage happens on the third trial or later.

Problem #8

Problem Statement

How many distinct solutions does the following equation have?

x1+ x2 + x3 + x4 = 100 such that

$x1 \in 1, 2, 3, ...$

$x2 \in 2, 3, 4, ...$

$x3$ and $x4 \in 0, 1, 2, ...$

Problem #10

Problem Statement

Suppose that the number of customers arriving at an Apple store is a Poisson random variable. Further suppose that, on average, c customers arrive per hour during its regular store hours ($9am5pm$). Let X be the number of customers arriving from $2pm$ to $3:30pm$.What is the probability that $X = 6$?

Practice Exam Problems, F2018

Problem Statement

Write if the following statements are True or False.

(a) If A and B are disjoint events then A and B are not independent.

(b) If A and B are disjoint events then $P(A \cup B) = P(A) + P(B)$.

(c) If S is a set containing exactly 6 elements, then the power-set of S contains exactly 36 elements.

(d) If $P(A) < P(B)$ then $P(A \cap B) < P(B)$.

(e) If $P(A) > 1/2$ and $P(B) > 1/2$ then $P(A \cap B) > 0$.

Problem #2

Problem Statement

Let us suppose that we have 10 men and 10 women to stand in a line.
(a) How many ways are there to arrange these people in the line if the men and women have to alternate (e.g., WMWM...)?
(b) If the first and the last one are of different genders, how many ways are there to line up?

Problem #4

Problem Statement

Let X be a random variable and $Y = aX + b$. Prove that $var[Y] = a^2 * var[X]$

Helpful Material (Time Permitting)

Helpful Material

Problem Statement

Prove that $var[X] = E[X^2] - [E[X]]^2$

FIN