Quiz 1 Study Guide

The quiz will be in-class on Friday, March 13. It will be 15 minutes long. *Some combination of the following problems will be on the quiz. You do not need to turn this study guide in; it is purely for your benefit. On the exam, please aim to answer the questions as precisely as you can (when grading your answers, I will be looking for mathematical definitions, not examples).*

1 Questions from before quiz 1 (some of these will be on quiz 2)

Problem 1. What does it mean for two events A and B to be ***mutually exclusive***?

Problem 2. In order for a function $\mathbb{P}$ to be a ***probability measure***, it must satisfy three axioms. State all three axioms.

Problem 3. Let A and B be events, and assume that $\mathbb{P}[A] > 0$. What is the ***conditional probability of B given A***?

Problem 4. What is a ***k-tuple***?

Problem 5. Describe the difference between a ***combination*** and a ***permutation***.

Problem 6. A ***set*** is an _____ collection of elements, all of which are _____.

Problem 7. What does it mean for two events to be ***disjoint***?

Problem 8. What is the ***sample space*** of an experiment? What is an ***event***?

Problem 9. What does it mean for a sequence of events $E_1, E_2, E_3, \ldots$ to be ***pairwise disjoint***?

Problem 10. Let A and B be events. Define the following terms

- the ***complement*** of A
- the ***union*** of A and B
- the ***intersection*** of A and B

Problem 11. What does it mean for to events A and B to have a ***positive relationship***? A ***negative relationship***?

2 New stuff since quiz 1

Problem 12. What does it mean for n events $A_1, \ldots, A_n$ to be ***mutually exhaustive***?

Problem 13. What does it mean for two events to be ***independent***? What does it mean for them to be ***dependent***?

Problem 14. What is a ***random variable***?

Problem 15. What does it mean for n events $A_1, \ldots, A_n$ to be ***mutually independent***?

Problem 16. What does it mean for a random variable to be ***discrete***?

Problem 17. What is the ***probability mass function*** (pmf) of a discrete random variable?

Problem 18. What is the ***cumulative distribution function*** (cdf) of a random variable X?

Problem 19. Suppose X is a discrete random variable. What is the ***expected value*** of X?

Problem 20. What is ***linearity of expectation***?

Problem 21. What is the ***variance*** of a random variable? The ***standard deviation***?

Problem 22. What is a ***binomial*** random variable? Make sure to state the probability mass function.

Problem 23. What is a ***geometric*** random variable? Make sure to state the probability mass function.

Problem 24. What is a ***Poisson*** random variable? Make sure to state the probability mass function.

Problem 25. What is a ***probability density function***?

Problem 26. What does it mean for a random variable to be ***continuous***?

Problem 27. What is a ***uniform*** random variable? Make sure to write down the pdf.

Problem 28. What is an ***exponential*** random variable? Make sure to write down the pdf.

Problem 29. What is the ***expected value*** of a continous random variable?