

STAT 3375Q: Introduction to Mathematical Statistics I
Spring 2024

Quiz 1 Review Exercises

Quiz Date: 24 January, 2024

INSTRUCTIONS:

- The quiz is consist of only one problem taken from this list of five problems.
- This is a closed book, closed notes, closed laptop/computer quiz.
- The duration of the quiz is 15 minutes.
- The material for the quiz is Lectures 1 & 2 and the homework exercises.
- A calculator is not necessary. You can keep your final answers as fractions in the simplest form.
- To merit partial points, make sure to justify/explain your thoughts and solutions, using notation and terminology properly, and clearly defining any events and random variables that you use.
- Do not be late. The quiz will start at exactly 4:40pm and end at 4:55pm.

Problem 1

Let E , F , G be three events. Find expressions for the following events using notations for intersection, union, and complement:

- a. only F occurs,
- b. both E and F but not G occur,
- c. at least one event occurs,
- d. at least two events occur,
- e. all three events occur,
- f. none occurs,
- g. at most one occurs,
- h. at most two occur.

Solution:

Problem 2

If the occurrence of B makes A more likely, does the occurrence of A make B more likely?

Solution:

Problem 3

In a class there are four freshman boys, six freshman girls, and six sophomore boys. How many sophomore girls must be present if sex and class are to be independent when a student is selected at random?

Solution:

Problem 4

Suppose we repeatedly roll two fair six-sided dice, considering the sum of the two values showing each time. What is the probability that the first time the sum is exactly 7 is on the third roll?

Solution:

Problem 5

Suppose that we ask randomly selected people whether they share your birthday.

- a. Give an expression for the probability that no one shares your birthday (ignore leap years).
- b. How many people do we need to select so that the probability is at least 0.5 that at least one person shares your birthday?

Solution: