

Probability III – 2009/10

Warm-ups

JRJ

These questions are to remind you of some of the probability theory you will need in this module. In particular they revise the topics of conditional probability and random variables which will be used extensively.

This sheet will not be marked but I am happy to discuss your answers in class or in an office hour.

1. Define conditional probability and write a short summary of some of the more important properties and results involving it. Your account should include the statement of the Theorem of Total Probability and a few sentences describing the sort of situations in which you would use it.
2. You have a standard fair 6-sided die and a fair coin. You roll the die giving a number N . You then toss the coin N times. What is the probability that all the tosses come up heads? What is the expectation of the number of heads seen?
3. Define what is meant by an event and a random variable. Write a short description of the difference between them aimed at a confused first-year student.
4. Write a brief summary of each of the following distributions: Binomial, Poisson, Uniform, Exponential.
5. The number of telephone calls I receive in any time interval of length t hours has a $\text{Poisson}(t)$ distribution, with the number of calls in disjoint (non-overlapping) time intervals being independent. I tell you that I received exactly n calls in the last hour. Given this information what is the conditional probability that I received exactly k calls in the last half hour where $0 \leq k \leq n$?