

## APPM 3570: Homework Set 4

Due Wed. Feb. 14, 2018

*Note: To help out the LAs, please draw a grading table at the top of the first page of your homework. The table should have five rows and two columns, just like the ones drawn on your graded homework.*

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1. Chapter 3 in Ross: Problems 31; 32; 45; 51; 57; 76; 91; Theoretical Exercise 6
2. A biased coin ( $P(H) = p$ ,  $P(T) = 1 - p$ ) is tossed till a head appears for the first time. What is the probability that the number of required tosses is odd? What is this probability for a fair coin, i.e.,  $p = 0.5$ ?
3. Consider a population where 30% of people suffer from a certain disease. There is a diagnostic test for detecting this disease with the following properties:
  - When applied to a person who has the disease, the test gives a positive result 95% of the times.
  - When applied to a person who does not have the disease, the test gives a negative result 90% of the times.

Suppose that this test came out to be positive for a member of this population. What is the probability that person has the disease?