

Math 1610
make-up midterm
Oct 21, 2008

You may use one page of notes but no other texts or information sources. No calculators, computers, web resources. Reduce your answers as best you can.

- 1.** 4 coins are tossed, two of which are fair and two of which have bias $2/3$ (the probability of heads is $2/3$). What is the probability that exactly 2 heads come up?
- 2.** What is the probability of getting three red cards and two black cards when dealt 5 cards from a deck consisting of 5 red cards and 5 black cards?
- 3.** A coin with unknown bias (initially assumed to be uniform in $[0, 1]$) is tossed twice and heads comes up both times. What is the probability that the bias (probability of heads) is greater than $1/2$?
- 4.** A point (x, y) is selected uniformly at random in the square $[0, 1]^2$. Given that $x + y^2 < 1$, what is the marginal distribution of x ?
- 5.** Two jars contains 3 marbles each. Jar one has three black marbles and one white marble and jar two has two blacks and two whites. Your friend reaches into a random jar and draw out two marbles, and announces that at least one is black. What is the probability that she reached into jar one?