

Math 3D03
Assignment #4

DUE: TUESDAY, MARCH 10TH, 2015 IN CLASS

Note: You can use symbolic software to check your answers (for the integrals for example) but you are required to show your calculations

1. If 5 indistinguishable marbles are placed at random into 5 boxes, what is the probability that **exactly one** box is empty?
2. A point starts at the origin on the real line and takes steps of length δ with probability $p > 0$ to the right and with probability $q = 1 - p$ to the left. Assuming that the steps are independent find the expected value of the **squared** distance from the origin after n steps.
3. A model for the movement of a stock price supposes that if the present price is S then after one period, it will either go up to uS with probability p or go down to dS with probability $1 - p$. Assuming that successive movements are independent, approximate the probability that the stock price will be up by at least 5% after the next 1000 periods for $u = 1.02$, $d = 0.95$ and $p = 0.6$.
4. Do problem 30.18 on page 1215 in the textbook.
5. Do problem 30.26 on page 1216 in the textbook.
6. (*bonus question*) Two teams A and B play a series of games until one of the teams wins four games (there are no tied games) as in the World Series or the Stanley Cup. Assume that the games are independent and that A wins each game with probability $p > 0$.
 - (a) Compute the probability that the seventh game is played
 - (b) What is the expected number of games played?
 - (c) What is the expected number of games played, given that team A won the series?
 - (d) Compute the probability that team A won the series, given that the seventh game was played