Math 3D03
M. Min-Oo
Assignment #3

DUE: TUESDAY, MARCH 4TH, 2014 IN CLASS (AT THE BEGINNING OF THE LECTURE PERIOD)

1. (*5 marks*) The complex potential

$$\Omega(z) = z + \frac{1}{z} - i\,\kappa\,\log(z)$$

where κ is a positive real number, describes a fluid flow around a cylinder with circulation. Locate the stagnation points (as a function of κ) and sketch the streamlines of the flow, using computer software such as Matlab, for the following κ values: $\kappa = 0.5,\ 1.5,\ 2,\ 3$.

2. (*5 marks*) Do problem 25.16 on page 923 in the textbook.

3. (*5 marks*) Do problem 30.10 on page 1212 in the textbook.

4. (*5 marks*) Do problem 30.18 on page 1215 in the textbook.

5. (*5 marks*) If 7 indistinguishable marbles are placed at random into 7 boxes, what is the probability that **exactly two** boxes are empty?

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