Read: RJ, sections 2.2, 2.4, 3.2.

Solve: RJ, Sec. 2.2 Ex 28, 29, Sec. 2.4 Ex 2, 3, 6, 9, Sec 3.2 Ex 7, 9, 13, 14.

I. There are $n$ unit circles and $n$ lines drawn in the plane. Prove that the regions in the plane separated by the lines and circles can be colored with two colors in such a way that no two adjacent regions have the same color.

II. Use induction to prove that $7^n - 1$ is divisible by 6, for all $n \geq 1$.

III. Find closed formulas for elements in the following sequences:
   a) $1, -3, 5, -7, 9, -11, \ldots$
   b) $1, 4, 10, 20, 35, 56, \ldots$
   c) $1, 1/2, 6, 1/24, 120, 1/720, \ldots$
   d) $1/4, 4/9, 9/16, 16/25, 25/36, \ldots$
   e) $1, 5, 21, 85, 341, 1365, \ldots$
   f) $1, 3, 15, 105, 945, 10395, \ldots$

IV. For the following sequences, Compute the first 5 elements. Then decide whether they are or are not increasing, decreasing, nonincreasing, and nondecreasing.

   \begin{align*}
   a_n &= 3^n - n \\
   b_n &= n - \frac{1}{n} \\
   c_n &= 3 + \frac{1}{n} \\
   d_n &= 3 + \frac{(-1)^n}{n^2} \\
   e_n &= \frac{13n^2}{2^n + 3^n}
   \end{align*}

This Homework is due Wednesday April 8, at 10:59:59 am (right before class). Please read the collaboration policy on the course web page. Make sure you write your name, your UCLA id number, and your section name (A,...,F) in the beginning and your collaborators' names at the end. Write the answers in inc and box them. Remember that in the proof questions, you also need to provide an explanation exhibiting your logic. In other questions, just the answer suffices.

P.S. Each item above has the same weight.