MATH 184A: PROBLEM SET 7

DUE AT 16:00 ON FRIDAY, MARCH 9

(1) Give an example showing that the Friendship Theorem does not hold for infinite graphs.

(2) Let G be the graph with vertex set $V = \{1, 2, \ldots, n\}$ and edge set $\{\{1, j\} : 2 \leq j \leq n\}$. Calculate the number of r-step walks on G which:
   (a) Begin and end at 1;
   (b) Begin and end at 2;
   (c) Begin at 1 and end at 2;
   (d) Begin at 2 and end at 3.

(3) Prove that any group of six people contains either three mutual friends, or three mutual strangers. Does the same statement hold for groups of five? Explain.