HOMEWORK SET #10 / CO1A / Fall 2009

In the following the index in the notation of the graphs will always denote the number of the vertices.

1.) Find the Ramsey number $R(C_4, C_4)$.

2.) Find the Ramsey number $R(P_4, K_4)$.

3.) Let T_m be an arbitrary, but fixed tree of m vertices. Show that $R(T_m, K_n) = 1+(m-1)(n-1)$.

4. Let $n > 1$ be a positive integer. Prove that $R(n+2, 3) > 3n$.

5.) Find $R(S_5, S_5)$ where S_5 is the star on 5 vertices, that is a vertex of degree 4 joint to 4 other vertices, each of degree 1.

6.) Prove that $R_k(3, 3, \ldots, 3) \leq [e \cdot k!] + 1$.

7.) Show that $R_k(3, 3, \ldots, 3) \geq 2^k + 1$.

8.) What is $\mathrm{ex}(n, P_4)$?

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