CSCI 241: Study Questions Do not turn this in please :-)

1. How many edges does a hypercube on k nodes have? What is the degree of each node? Prove.

2. What kind of representation would you use for a graph that is a cycle?

3. Is it true that a bipartite graph always has $O(n)$ edges?

4. How many people of age under 18 do I need to have in a room so that there are at least two of the same age? Assume no one is 0 or 18.

5. I have three sets, A, B, and C. A has 20 people, B has 30, C has 23. 9 are in A and B, 8 in B and C, 6 in A and C, 1 in all three. How many are in at least one of the groups? Do not draw a Venn diagram.

6. There are 23 people with bad eyesight. 15 wear glasses, 12 wear contacts. How many wear both (maybe on different days)?

7. How many different soccer teams can you form out of 15 people?

8. I need one goalie, one left fielder, one right fielder in my soccer team (of 11). How many ways are there to pick these people?

9. Show that any wheel has a Hamiltonian cycle.

10. What are the conditions for a wheel to have an Eulerian circuit?

11. How many leaves are there in a complete 3-ary tree of height h?

12. How many edges do I need to remove to disconnect W_k?

13. How many edges do I need to remove to separate a tree into 4 connected components?

14. Does a tree have any bridges?