

MATH 634, Spring 2014
PRACTICE PROBLEMS
in preparation for Exam 1 on Monday, March 17, 2014.

The exam covers:

- *Pearls in Graph Theory*, Sections 1.1 through 2.3 and 3.1.
- Additional topics that are included in the course notes

Below are some questions that practice concepts from the class.

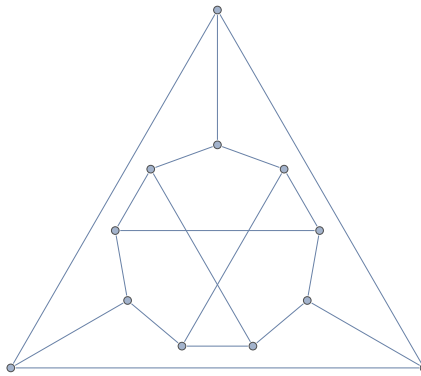
- Book questions: 1.1.6, 1.2.1, 1.2.7, 1.2.10, 1.3.8, 1.3.9, 1.3.20, 2.1.3, 2.1.4, 2.1.6, 2.2.3, 2.2.5, 2.3.2, 2.3.7, 2.3.14, 2.3.18, 3.1.1, 3.1.2, 3.1.7

P1. Prove that at a party with 49 people, there is always a person who knows an even number of others. [Assume acquaintance is mutual.]

P2. (a) If G is a k -regular graph, what can you say about G^c ?

(b) If G is a connected graph, what can you say about G^c ?

P3. Determine and prove the edge chromatic number for this graph:



P4. For some k greater than or equal to 2, find a k -regular graph that has a bridge.

P5. We know that in a tree with n vertices, the number of edges is $n - 1$.

Prove or disprove: Any graph with n vertices that has fewer than $n - 1$ edges is a forest.

P6. Describe the most general 2-regular graph. Prove that all 2-regular graphs fit your description.