

Math 101 Homework

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due 20 Jan 2015

Complete the following problems. Fully justify each response.

1. A graph $G = (V, E)$ is called *bipartite* if the vertex set can be written as $V = A \cup B$, where A and B are disjoint, and every edge has one endpoint in A and the other in B .

Let G be a graph. Prove that G is 2-chromatic if and only if G is bipartite.

2. Determine the chromatic number of the Petersen graph.
3. A *cycle* on n vertices (also called an n -cycle, denoted C_n) is the graph you get by considering an n -gon, with the vertices of the n -gon the vertices of the graph, and the edges of the n -gon the edges of the graph. For example, a 6-cycle and a 7-cycle are shown below.

Determine $\chi(C_n)$ for any n .

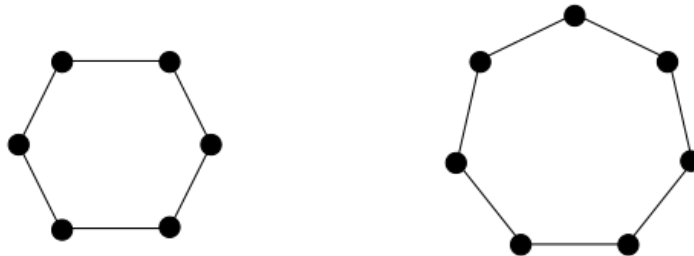


Figure 1: C_6 (left) and C_7 (right)