

## Assignment 9

- Write a brief article (2–3 pages) about one of the following:
  - The Internet as a Graph
  - The Proof of the 4-Color Theorem
  - Graphs in the Social Sciences
- An outerplanar graph  $G$  is a graph that can be drawn in the plane with all vertices on the outer face.
  - (a) Show that  $\chi(G) \leq 3$ .
  - (b) Show that  $K_4$  and  $K_{2,3}$  are not outerplanar.
  - (c) It is known that a graph is outerplanar if and only if it does not contain a subdivision of the two graphs mentioned in (b). Prove that one can color the vertices of  $G$  with two colors so that each vertex has at most two neighbors of the same color and there are no monochromatic cycles.
- West 6.1.21, 6.1.25

**Due: 8:05am Thursday April 22**