

Problem of the Month, October 2008

Please turn all solutions into Dr. Dunn's office, JB 322. You may slide your solutions under his door as well. Most elegant solution wins a \$10 gift certificate to the bookstore! Solutions will be accepted anytime during the month of October. Good luck!

This month's problem comes in two parts. Part one: Suppose that you arrange k lines in the plane \mathbb{R}^2 that all go through the origin. Prove that you need at most 2 colors so that regions of the plane which are adjacent are colored differently. (Regions are defined to be adjacent if they share any part of the same line segment.) Part two: Suppose that you still have k lines, but that they are no longer assumed to all go through the origin. Prove again that with this weaker hypothesis you still only need two colors so that no two adjacent regions are colored differently.