2004

Conversations among Women in Mathematics (Workshop Information)

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Fall Math Events 2004

Workshop Information for *Conversations among Women in Mathematics*:

**Code Breaking**
Dr. Amy Bellis, National Security Agency
Through several hands-on examples, we will explore two simple methods of encoding information and discuss strategies for breaking codes. This workshop is suitable for both high school and college students.

**Crayons and Computers: Awesome Pictures of Mathematics**
Dr. Annalisa Crannell, Franklin and Marshall College
It is easy to see, just by looking, that certain kinds of art are beautiful. But how could we "see" beautiful mathematics just by looking? It would help if we could first understand the mathematics that lies within various kinds of visual art. We will take an artistic mathematical tour through Amish quilts (symmetry and tessellations), Japanese woodblock paintings (fractal geometry), and especially Renaissance perspective painting (similar triangles). This workshop is aimed mainly at high school students.

**Pondering Pebbling Problems**
Dr. Aparna Higgins, University of Dayton
Suppose you want to move some material from point A to point B. You need several steps, and at every step, you lose half of the material. If your goal is to get a certain amount of material to any specified point, how much do you need to start with? More precisely, distribute pebbles (non-negative integers) on the vertices of a graph. Define a pebbling move as: "Remove two pebbles from a vertex, move one pebble to an adjacent vertex, and throw away the second pebble." What is the minimum number of pebbles needed so that any distribution of this number of pebbles will guarantee that one pebble will reach an arbitrary, but fixed, vertex in a finite number of pebbling moves? This number is the *pebbling number* of the graph.

In this workshop, participants will get some hands-on experience in finding pebbling numbers for several classes of graphs. In addition, participants will work on some open problems in pebbling and get a taste of doing mathematical research.

This workshop is aimed mainly at college students.

**Geometry with Geometer's SketchPad**
Dr. Becky Krakowski, University of Dayton
We will go through a brief introduction/review of SketchPad (a dynamic geometry software package) -- advanced or beginning users are welcome! We will then explore some interesting applications, such as choosing the best location for a new fire station that will help protect three suburban neighborhoods.

This workshop is aimed mainly at high school students.

*I'M MY OWN GRANDPA!* Smullyan's Robots, Their
Kurt Gödel's theorems on the incompleteness of formal mathematical systems are among the greatest accomplishments of mathematics. The workshop presents an approach to the ideas in Gödel's work, based on some of the "robot puzzles" of Raymond Smullyan. In an imaginary world, robots build and program other robots, according to the rules laid down in their own programming. Sometimes the "offspring" resembles the "parent" and sometimes not. Other robots roam the world, destroying other robots of a given type. By exploring the ecology of this bizarre world, we can discover fascinating insights into the nature of formal logical systems.

This workshop is aimed mainly at college students.