



Cornell University

K-12 Education and Outreach, Mathematics Department

MATH 5080

Mathematics for Secondary School Teachers

March 12, 2011

9:00 am – 2:30 pm

406 Malott Hall

8:45-9:00 **Welcome** (juice and bagels provided)

9:00-9:15 **Introductions**

9:15-11:30 **Big Numbers, Graph Coloring, and Hercules' Battle with the Hydra**

Timothy Riley (Cornell University)

We will explore some of the extraordinarily large numbers that arise in mathematics. On our tour we will encounter problems about coloring graphs, we will explore a re-imagining of Hercules' battle with the Lernean hydra, and we will touch upon the limits of computation and provability.

11:30-12:00 **Lunch** (provided)

12:00-2:15 **Self-Similar Tiles with Fractal Boundaries**

Robert Strichartz (Cornell University)

We will explore some very exotic and appealing tiles that have boundaries that are fractal, including the Levy Dragon. We will learn how to draw approximations on graph paper, we will manipulate computer drawn figures on transparency paper to observe both the self-similarity and the tiling properties, and we will use programs on publicly available websites to help us understand these objects. Along the way we will discuss some geometric concepts including: interior, boundary, outer boundary, connectedness, connected components, similarity transformations, self-similarity, formulas for sets, limits of sets, and dimension. Many of these concepts relate to K-12 geometry content and can help illuminate topics you teach. You will receive material that you can use for enrichment activities with your students.

2:15-2:30 **Wrap Up**

Contact Mary Ann Huntley by Wednesday, March 9th if you plan to attend.

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