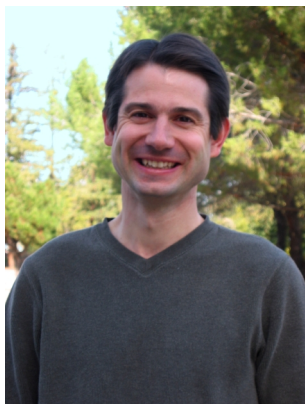# The Teacher's Circle
August 14–18, 2006

Hello, I am Sam Vandervelde. I grew up in central Virginia, attended Swarthmore College, began graduate work at The University of Chicago, and then made my way to Boston. While there I spent five years teaching mathematics at The Roxbury Latin School, a private boys school in Boston for grades seven through twelve. A few years later I completed my doctoral work through the University of Chicago and taught briefly at Wellesley College before our family relocated to the San Francisco Bay area. My wife is currently conducting hearing research at Stanford University, while I am a visitor in their math department. We have two little boys who are a little over two and almost five.

I have become more involved than ever with math education at the middle school level since arriving in California. This summer I will spend four weeks teaching at the EPGY Summer Institutes Middle School Program and two weeks teaching at Mathpath (a residential math experience for middle school students) prior to The Teacher's Circle. During the year I coordinate The Stanford Math Circle and regularly speak at the other math circles in the area. My mathematical interests include number theory and graph theory. I also enjoy spending time with my two boys, playing soccer, rock climbing, and cooking.

Below I have included several problems to whet your appetite for some of the mathematics we will be considering this August. Read through them and try any problems that look interesting.

1. Find a way to tile a 5×5 board with eight "long dominoes" and one small square, as shown at right.
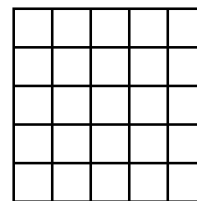
2. The numbers from 1 to 10 are written on a blackboard. If you repeatedly choose two numbers, erase them, and replace them with their difference (higher minus lower), is it possible to end up with only a 1 on the board? How about a 2?

3. What are the next ten "numbers" in the sequence that begins

$$1, 10, 11, 100, 101, 110, \ldots$$