Department of Mathematics

January 18, 2013

UNDERGRADUATE MATH SEMINAR

The next seminar of will be

DATE: **TUESDAY, January 22nd**

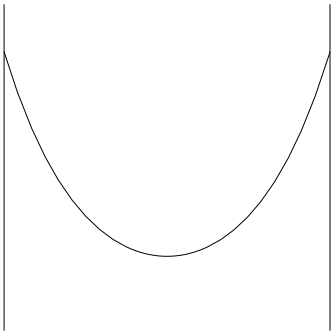
Time & **4:30pm –** Refreshments in **Bailey 204**

Location: **4:45pm –** Seminar in **Bailey 207**

In this week's seminar, **Professor Susan Niefield** of the Union College Math Department will be presenting the following talk.

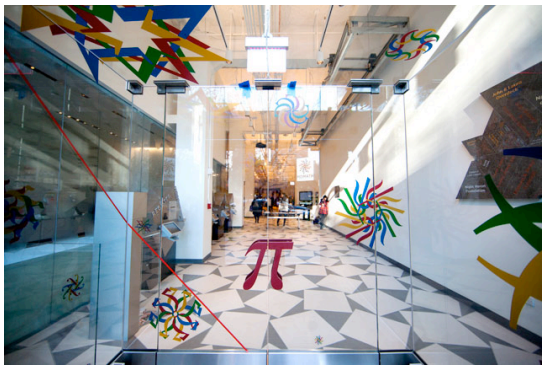
Professor Susan Niefield

TITLE: What Is the Shape of a Hanging Cable?



ABSTRACT: If you think that a cable suspended between two poles looks like a parabola, you're in good company. Galileo (~1600) thought so, too. But, in 1646 at age 17, Christiaan Huygens showed that Galileo was wrong! Later, Huygens coined the name "catenary" for the shape of a hanging cable. In 1691, Huygens, Leibniz and one of the Bernoulli brothers, discovered an equation for the curve. In this talk, we will use exponential functions and integral calculus to derive an equation for the catenary curve.

What and Where in the World Are These?



Extra credit: Believe it or not, the picture above is related to Professor Niefield's seminar talk (described above). How?

Extra extra credit: Mathematically, what is pictured to the left? Also, where is Union College's comparable model?

Turn the page and find out…

The National Museum of Mathematics (MoMath) Opens

The New Yorker magazine, in 2009 (http://www.newyorker.com/talk/2009/08/03/090803ta_talk_paumgarten) reported, "For ten years, Glen Whitney, a mathematician, worked as an algorithm manager at the giant quantitative hedge fund Renaissance Technologies, on Long Island. He was the man – or one of many - in the so-called 'black box.' During that time, Renaissance did extremely well, as did Whitney, and so when he left the firm … he had the wherewithal to devote himself to his favorite shower-time epiphany: that the world needs … is a museum devoted to math." On December 15, 2012, Whitney's dream was realized and the United States' first museum dedicated to mathematics, The National Museum of Mathematics, opened in New York City. The pictures on the previous page are installations at the museum, dubbed MoMath.

The picture in the top left shows a hallway in the museum. Notice the interesting tiling on the floor.

The picture in the top right shows a "Square-Wheeled Trike" on a strange looking track. What is interesting is that while it looks like the rider is in for a jostling ride, the surface is actually designed to give the cyclist a smooth ride! The curve defining the bumps in the surface comes from the catenary – the same curve that describes the shape of a hanging cable that Professor Niefield will be talking about.

The picture in the bottom left shows the "Hyper Hyperboloid." As written in The New York Times, "If you sit on a chair at the center … you are surrounded by colored cables arranged in two surrounding circles. As you rotate the chair, they begin to angle in opposing directions, until the column of cables is pulled together in the center above your head. You are literally on the central axis of a graceful and surprising shape, its surfaces and contours outlined by series of stretched lines." *HEY – ISN'T THERE SOMETHING LIKE THAT IN **BAILEY HALL**?* Yes, there is! One of the "Olivier Models" in the display case on the second floor of Bailey Hall contains a moveable model that can be used to demonstrate this family of so-called ruled surfaces. That model is a bit older than the one in the museum; it is truly a museum piece, built more than 160 years ago!

Math Club – Math Club – Math Club … and a Movie

On **Thursday, January 24**, the Math Club will be having ***two*** events. First, it will be having its weekly meeting at 1:00 in Bailey 204. Then later in the evening, the Math Club will be hosting a Movie Night! At 6:30pm at Golub House, **Professor Alan Taylor** will speak about John Nash's contributions to Mathematics. After, the club will watch **A Beautiful Mind**. Pizza and movie snacks will be provided! Feel free to contact **Maggie Weinreb '13** (weinrebm@garnet.union.edu) with any questions.

Problem of the Newsletter: January 18, 2013

Last week's problem: Congratulations to **Han Lin '13** and alumnus **Brandon Bartell '10** for deciphering the message in the equation in last week's problem. A solution has been posted on at the newsletter sites on the bulletin boards in Bailey Hall.

This week's problem: There are 7 white balls and 3 red balls in a bag. On each turn, we remove a ball randomly from the bag and then place a new white ball back into the bag. Find the probability that it takes exactly 5 turns to remove all of the red balls from the bag. (On turn 5, we must pull the third red ball.)

Professor Friedman will accept solutions to this problem until noon on Thursday, January 24.