

UNDERGRADUATE MATHEMATICS SEMINAR

The next seminar of the winter term will be:

DATE: **MONDAY, January 26th**

Time & **4:15pm** – Refreshments in the Math Common Room, **Bailey 204**

Location: **4:30pm** – Seminar in **Bailey 207**

In this seminar, **Professor Joan P. Hutchinson**, of **Macalester College** will deliver the following talk:

TITLE: Some Mathematical Results on Guarding Art Galleries

ABSTRACT:

- What is the minimum number of "guards" needed to guard the interior of the "art gallery," shown in Figure 1? Rules: a guard stands in one place, a guard can look and see in 360 degrees, and every point inside and on the boundary of the gallery must be visible to some guard.
- What is the minimum number of guards needed to guard the exterior of this art gallery? Same rules except that every point outside and on the boundary of the gallery must be visible to some guard.
- And what is the minimum number of guards needed to guard the interior of this art gallery with interior walls, as in Figure 2? Same rules except that (guards cannot see through walls, but can see through the small doorways in each interior wall and) a guard placed in a doorway can see in 180 degrees in both rooms.
- Finally suppose you only know that an art gallery has 25 walls. Then how many guards might you need in the worst case? And what if there are four interior walls, arbitrarily placed, each with a small door opening?

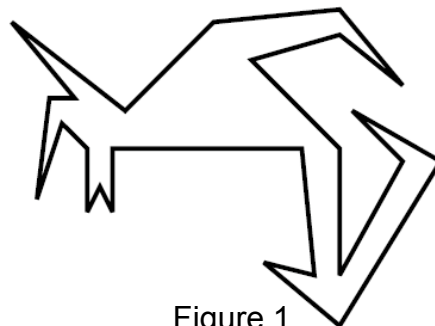


Figure 1

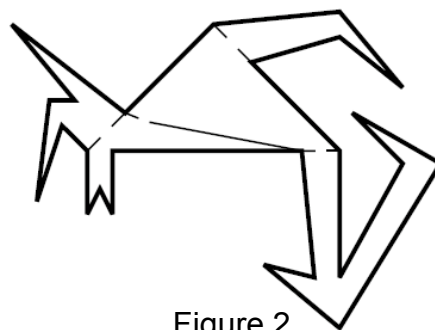


Figure 2

For a preview of upcoming seminars and a list of past seminars, visit <http://www.math.union.edu/~wangj/seminar09w.htm>

HRUMC: Volunteers Wanted!

Every year, Union sends a sizeable contingent to the Hudson River Undergraduate Math Conference (HRUMC). However, this year the conference is coming here. On **April 18**, Union College will host the HRUMC, which will be many students' first opportunity to experience a math conference.

This will be an awesome day, but in order to make it run we need students to volunteer. We need all sorts of volunteers, including

- T-shirt and program designers,

- people to sit at a registration desk and register the ~500(!) participants,
- IT people to troubleshoot,
- photographers, and
- people to point visitors in the right direction.

If you are interested in volunteering, there will be a meeting about volunteering this **Tuesday, the 27th, at 4:00 PM in the Math Common Room**. If you are unable to make the meeting but are still interested in helping out, please e-mail Ben Miles at milesb@union.edu.

My Putnam Experience – by Ben Miles, '10

Every student has a story about what they did over break, the job they got, the places they went, and the people they saw; but three students, **Peter Bonventre**, **Daniel Gnoutcheff**, and I, include coming back to Union College on December 6th to take an exam. Now, while most people were enjoying a nice break from tests and homework why would three students willingly come back to take an exam? To make it worse, we knew that in all likelihood, we would all get 0 out of 120 points, since that is the median score for the exam.

The exam that we took is called the Putnam. It is a 12-question, 6-hour contest that is broken up into two sessions, 3 hours in the morning and 3 hours in the afternoon. The problems only require basic math knowledge, but are extremely difficult. Most people who have taken the Putnam suggest finding one question that you think you can solve and spending all your time on that one.

This was my third Putnam Exam, so I am somewhat used to the experience. I got off work in New Jersey at 6 PM on Friday, ate a quick dinner and then drove two and a half hours to the college. It is important to note that for those who do not live nearby, the math department can arrange for you to take the exam at a school closer to your home (as it did this year for two first-year participants). I stayed overnight at Union; the math department was nice enough to arrange for me to stay in my room.

The next morning I woke up and got to the Math Common Room around 9 AM. There I met up with the other students, and ate bagels with cream cheese. The first session lasted from 10 AM to 1 PM. The math department then took us out to lunch at Pinhead Susan's where we discussed the 6 problems we had seen in the first session. The second session went from 3 PM to 6 PM, another 6 questions.

After it was over I felt slightly relieved, but I also couldn't wait to give the problems another go. The next day I headed back home having taken the Putnam exam for a third time.

The whole weekend was amazing fun, and I would recommend it to anyone. The problems were fun to attack during the exam, and also fun to try again later. I think my favorite question was "What is the maximum number of rational points that can lie on a circle not centered at a rational point?" If this sounds like fun to you, The University of Rochester Math Olympiad is coming up on March 28th, and there will be another Putnam next year. I hope to see you at both.

Problem of the Newsletter: January 23, 2009

Thanks to **Conor O'Reilly** for sharing his thoughts on last week's Problem of the Newsletter. His effort will be posted on the Bailey Hall bulletin boards, and we will leave last week's problem open until a full solution is received.

Here is this week's problem: Let's take the one from the Putnam Exam that Ben Miles mentioned in his article above: What is the maximum number of rational points that can lie on a circle not centered at a rational point? (Try it without searching for a solution online!)

Professor Friedman will accept solutions to this problem until 12:00 noon Thursday, January 29th. Email your solution to him (friedmap@union.edu) or put it in his mailbox in the Math Department's office on the second floor of Bailey Hall.