## UNDERGRADUATE MATH SEMINAR

After two seminars last week, we will be having another two in rapid succession, one on Friday, and one the next Monday. Please note the day and time of these seminars as they are not in the "usual" Thursday time slot.   Look for the posters around Bailey Hall with speaker, title and abstract information.

DATE: **Friday, February 7**

Time &   **4:00 pm** – light refreshments in Bailey 204

Location: **4:15 pm** – Seminar in **Bailey 207**
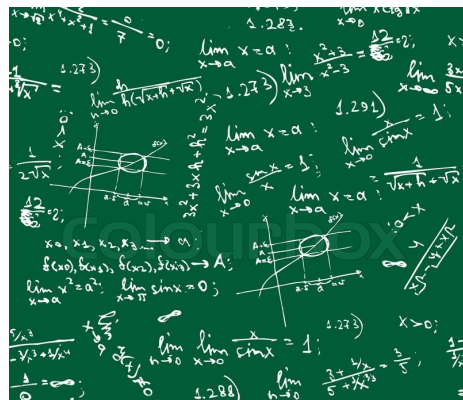
DATE: **Monday, February 10**

Time &   **4:00 pm** – light refreshments in Bailey 204

Location: **4:15 pm** – Seminar in **Bailey 207**

Math Contest this Saturday

The 14th annual **University of Rochester Math Olympiad** will be held on **Saturday, February 8** from **9:30am to 12:30pm.** This contest consists of four proof-based problems to be solved over the three-hour time period with CASH prizes to the top three performers! To participate in this Olympiad, please contact **Professor Ehssan Khanmohammadi** (kahnmohe@union.edu, in Bailey 108B).

Mark Your Calendar: HRUMC April 4, 2020 at Mt. Holyoke College

The 27th Hudson River Undergraduate Mathematics Conference (HRUMC) will be **Saturday, April 4th** at **Mt. Holyoke College.**

The HRUMC is a one-day mathematics conference held annually each spring, attended by students and faculty from colleges and universities throughout New York and New England. It was founded by four colleges, Siena, Skidmore, **Union**, and Williams, with the goal of providing undergraduates with the experience of attending and/or presenting at a professional mathematics meeting, and was designed primarily with the student in mind. It is the premier regional undergraduate mathematics conference after which several others have been subsequently modeled nationwide.

If you have done an interesting math project (in the summer, for your thesis, on your own) and would like to share your work with like-minded math students and faculty from the region, consider preparing a 15 minute talk for the HRUMC. If you would like to hear about work by students and faculty, consider simply attending this conference.

There will be more announcements about this conference in the coming weeks – keep tuned!

A Quick Tidbit!

This past Sunday had a date that is an eight-digit palindrome, that is, it reads the same forwards as it does backwards: 02/02/2020. When was the last such date? When is the next one?

Found on Facebook – from "I love Mathematics"

Patterns everywhere … until there is none!

After some initial investigations, it would be tempting to try to prove inductively that

$$\int_0^\infty \frac{\sin(x)}{x}\frac{\sin\left(\frac{x}{3}\right)}{\frac{x}{3}}\cdots\frac{\sin\left(\frac{x}{2n-1}\right)}{\frac{x}{2n-1}}\,dx = \frac{\pi}{2}$$

but, alas….

Do you have any favorite results that are valid and follow a pattern for small n but then fail? Send them to **Professor Friedman** (friedmap@union.edu) for publication in the newsletter!

See, this is why I have trust issues

$$\int_0^\infty \frac{\sin(x)}{x}\,dx = \frac{\pi}{2}$$

$$\int_0^\infty \frac{\sin(x)}{x}\frac{\sin(x/3)}{x/3}\,dx = \frac{\pi}{2}$$

$$\int_0^\infty \frac{\sin(x)}{x}\frac{\sin(x/3)}{x/3}\frac{\sin(x/5)}{x/5}\,dx = \frac{\pi}{2}$$

This pattern continues up to

$$\int_0^\infty \frac{\sin(x)}{x}\frac{\sin(x/3)}{x/3}\cdots\frac{\sin(x/13)}{x/13}\,dx = \frac{\pi}{2}.$$

At the next step the obvious pattern fails,

$$\int_0^\infty \frac{\sin(x)}{x}\frac{\sin(x/3)}{x/3}\cdots\frac{\sin(x/15)}{x/15}\,dx = \frac{467807924713440738696537864469}{935615849440640907310521750000}\pi$$

$$= \frac{\pi}{2} - \frac{6879714958723010531}{935615849440640907310521750000}\pi$$

$$\simeq \frac{\pi}{2} - 2.31 \times 10^{-11}.$$

Math Club and AWM Meet

Two organizations for students interested in math, Math Club, and AWM (Association for Women in Mathematics) exist, meet regularly, plan, and host fun events for the campus community, such as game nights, movie nights, dinner and discussion with professors, volunteer outings, and many others. Club meetings are typically every other week, and activities are publicized through Campus Events among other means. Look for notices and announcements, and join the fun!

Problem of the Newsletter – February 3, 2020

Last week's problem: Congratulations to **Khoa Ngo The** for solving last week's problem. A solution to last week's problem has been posted at the newsletter sites in Bailey Hall.

This week's problem: This one is a bit challenging – can you crack this nut? (The source of this problem will be revealed next week.)

Determine all possible values of the expression $A^3 + B^3 + C^3 - 3ABC$ where $A, B,$ and C are nonnegative integers.

Professor Friedman (friedmap@union.edu) will accept solutions until noon on Friday, February 7.