MATH 4301, Honours Seminar
(in class option)

Instructor: Dr. Razvan Anisca, RB 2049, email: ranisca@lakeheadu.ca

Class times: Tuesday/Thusday 1-2:30pm

Office hours: email for appointment

Textbook:

- A. M. Yaglom, I. M. Yaglom, *Challenging mathematical problems with elementary solutions*, volume 2, 1987.

- B. R. Gelbaum, J. M. H. Olmsted, *Counterexamples in Analysis*, San Francisco, Holden-Day Inc., 1964.

Syllabus: (1) Wallis' formula for π and Sterling's limit formula, (2) Prime numbers Theorem, (3) Example of a continuous function nowhere differentiable on an interval.

Grade: The final grade will consist of four parts: attendance (30%), class participation (15%), short individual presentations (30%), typed project (5-7 pages) (25%).

Accommodations: Lakehead University is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging academic accommodations for students with disabilities to ensure they have an equitable opportunity to participate in all of their academic activities. If you think you may need accommodations, you are strongly encouraged to contact Student Accessibility Services (SAS) and register as soon as possible. For more information please visit:

$$http://studentaccessibility.lakeheadu.ca.$$

Wallis' formula

$$\frac{\pi}{2} = \frac{2}{1} \cdot \frac{2}{3} \cdot \frac{4}{3} \cdot \frac{4}{5} \cdot \frac{6}{5} \cdot \frac{6}{7} \cdots$$

Sterling's Limit Formula

$$\lim_{n \to \infty} \frac{n!}{\sqrt{2\pi n}(n/e)^n} = 1.$$

Prime Numbers Theorem

Given a positive integer N let denote by $P(N)$ the number of all prime numbers less or equal than N. Then

$$P(N) \approx \frac{N}{\ln N}.$$