

UNDERGRADUATE MATHEMATICS SEMINAR

No seminar during finals week. See you next term!

Winter 2007 Math Final Exam Schedule

<u>Course #</u>	<u>Course Name</u>	<u>Professor</u>	<u>Room</u>	<u>Day</u>	<u>Date</u>	<u>Time</u>
IMP*112*01	Integrated Math/Physics	Barbanel, J.	NWSE 112	Wed	March 19	1:00 – 4:00 P.M.
MTH*101*01	Calculus with Precalc 2	Taylor, A.	BAIL 100	Mon	March 17	9:00 - 11:00 A.M.
MTH*101*02	Calculus with Precalc 2	Zwicker, W.	BAIL 104	Thu	March 20	8:30 - 10:30 A.M.
MTH*104*01	Stat Intro: Analysis of Data	Black, K.	OLIN 306	Thu	March 20	11:30 - 1:30 P.M.
MTH*110*01	Calculus 1	Friedman, P.	BAIL 100	Tue	March 18	8:30 - 10:30 A.M.
MTH*112*01	Calculus 2	Plofker, K.	BAIL 104	Thu	March 20	2:30 - 4:30 P.M.
MTH*112*02	Calculus 2	Black, K.	OLIN 106	Mon	March 17	9:00 - 11:00 A.M.
MTH*113*01	AP Calculus	Zimmermann, K.	BAIL 102	Tue	March 18	8:30 - 10:30 A.M.
MTH*115*01	Calculus 3	Wang, J.	SSCI 104	Wed	March 19	1:00 - 3:00 P.M.
MTH*115*02	Calculus 3	Wang, J.	SSCI 104	Wed	March 19	1:00 - 3:00 P.M.
MTH*117*01	Calculus 4	Johnson, B.	BAIL 102	Wed	March 19	1:00 - 3:00 P.M.
MTH*117*02	Calculus 4	Friedman, P.	BAIL 106	Wed	March 19	1:00 - 3:00 P.M.
MTH*127*01	Numerical Methods	Cervone, D.	BAIL 201	Thu	March 20	11:30 - 1:30 P.M.
MTH*128*01	Probability	Niefield, S.	BAIL 104	Mon	March 17	9:00 - 11:00 A.M.
MTH*130*01	Differential Equations	Tonnesen-Friedman	BAIL 207	Thu	March 20	11:30 - 1:30 P.M.
MTH*199*01	Intro to Logic & Set Theory	Tonnesen-Friedman	BAIL 102	Mon	March 17	9:00 - 11:00 A.M.
MTH*199*02	Intro to Logic & Set Theory	Barbanel, J.	NWSE 116	Mon	March 17	9:00 - 11:00 A.M.
MTH*221*01	Mathematical Cryptology	Lesh, K.	OLIN 106	Wed	March 19	1:00 - 3:00 P.M.
MTH*221*02	Mathematical Cryptology	Lesh, K.	OLIN 106	Wed	March 19	1:00 - 3:00 P.M.
MTH*340*01	Linear Algebra	Cervone, D.	BAIL 100	Wed	March 19	9:00 - 11:00 A.M.
MTH*432*01	Abstract Algebra 2	Niefield, S.	BAIL 102	Thu	March 20	2:30 - 4:30 P.M.

Thank you, CHC Tutors! Please join me in thanking all the tutors – **Susan Beckhardt, Kate Colantuono, Ronghua Dai, Laura Hutchinson, and Nikhil Patel** – for their contributions to the success of this valuable resource. See you next term!

HRUMC: April 19th 2008. Sign-up now by contacting Prof. Friedman

Problem of the Newsletter: March 14, 2008

Congratulations to **Schuyler Smith** for a complete solution to last week's Problem, and an honorable mention is extended to **Brandon Bartell** for his partial solution. A solution to the first problem is sketched below, followed by Schuyler's solution to the second, more general problem.

Last week's problem: Show that no perfect square has a decimal expansion ending in 79. (Or, more generally, what are the possible two-digit endings of squares?)

Sketch of Simple Solution: The square of an even number is congruent to 0 modulo 4, and the square of an odd number is congruent to 1 modulo 4. Hence, every perfect square is congruent to either 0 or 1, modulo 4.

However, any number whose last two digits are 79 is congruent to 3 modulo 4, not 0 or 1! Hence no perfect square ends in 79.

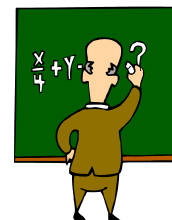
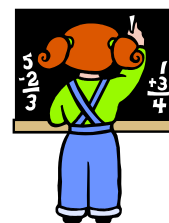
Sketch of More General Solution: (by Schuyler Smith)

First, note that we care only about the square of integers mod 100. Only the first two digits of a number will matter in this value, because every digit after the tens place is already a multiple of 100, and so will not affect the residue. Hence, we need only consider the integers from 0 to 99.

Also note that we can write the values from 51 to 99 as $100-x$, for some $0 < x < 50$. Then $(100-x)^2 = x^2 - 200x + 10000 \equiv x^2 \pmod{100}$. Similarly, we can write the values from 26 to 50 as $50-x$, for some $0 \leq x < 25$. Then $(50-x)^2 = x^2 - 100x + 2500 \equiv x^2 \pmod{100}$.

Therefore, we need only check the squares of the integers from 00 to 25, mod 100. By computer, it is easy to see they are 0, 1, 4, 9, 16, 21, 24, 25, 29, 36, 41, 44, 49, 56, 61, 64, 69, 76, 81, 84, 89, and 96. Note that 79 is not included on this list.

Here is this week's problem: Enjoy your Spring Break. Solutions to this (difficult?) problem will be accepted when you return!



This is the last
newsletter of
the term!

Good luck on
your finals!