### Winter 2007 Math Final Exam Schedule

**Thursday, March 15, 9:00 - 11:00 AM**
- MTH*110*02: Calculus 1, Cervone, BAIL 104
- MTH*112*01: Calculus 2, Lesh, OLIN 107+
- MTH*115*02: Calculus 3, Zimmermann, BAIL 106

**Thursday, March 15, 9:00AM - 12:00PM**
- IMP*112*01: Int Math/Physics 2, Black and Reich, NWSE 112

**Friday, March 16, 9:00 - 11:00 AM**
- MTH*113*01: AP Calculus, Friedman, BAIL 102
- MTH*115*03: Calculus 3, Barbanel, BAIL 201+
- MTH*199*01: Intro to Logic & Set Theory, Niefield, BAIL 100

**Monday, March 19, 9:00 - 11:00 AM**
- MTH*060*01: Mathematics & Politics, Taylor, BAIL 100
- MTH*128*01: Probability, Barbanel, BAIL 207
- MTH*340*01: Linear Algebra, Friedman, BAIL 104

**Monday, March 19, 1:00 - 3:00 PM**
- MTH*112*02: Calculus 2, Zimmermann, BAIL 102
- MTH*115*01: Calculus 3, Blue, BAIL 106

**Tuesday, March 20, 9:00 - 11:00 AM**
- MTH*051*01: Cryptology: Math of Secrecy, Lesh, OLIN 107+
- MTH*117*01: Calculus 4, Niefield, SSCI 016+
- MTH*117*02: Calculus 4, Johnson, SSCI 016+
- MTH*197*01: Discrete Math for Comp Sci, Taylor, BAIL 100
- MTH*448*01: Differential Geometry, Cervone, GOLB 105+

**Tuesday, March 20, 1:00 - 3:00 PM**
- MTH*101*01: Calculus w/Precalc, Zwicker, SSCI 012+
- MTH*101*02: Calculus w/Precalc, Zwicker, SSCI 012+
- MTH*224*01: Geometry, Tonnesen-Friedman, BAIL 100

**Wednesday, March 21, 9:00 - 11:00 AM**
- MTH*130*01: Ordinary Differential Equations, Black, OLIN 106+

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Thank you, CHC Tutors! The last night that the Calculus Help Center will be open this term is Tuesday, March 13. Please join me in thanking all the tutors – Susan Beckhardt, Jessica DiMarco, Michael Doctor, Dan Stevenson, Kelly Testa, and Peter Wright – for their contributions to the success of this valuable resource.
Problem of the Newsletter: March 9, 2007

Congratulations to Brandon Bartell ’10, Susan Beckhardt ’07, Patricia Linden ’09, Schuyler Smith and special problem solver, alumnus Joe Maguire ‘82, for submitting correct solutions to last week’s problem of the newsletter. Not only did Joe solve the stated problem, he extended the result to arbitrary bases, and rings, and included a cultural note that shows the solution he describes is restricted to a written presentation by contrasting our oral presentation of numbers with that of the Yukis. We reproduce Joe’s solution below.

Last week’s problem: In the following multiplication problem, A, B, C, and D are different digits. Find A+B.

Solution (JM): To solve for ABA, divide:
Then ABA equals CD/CD = (CD * 100 + CD) / CD = (CD * 100) / CD + CD / CD = 100 + 1. Consequently ABA = 101 and A = 1, B = 0 so that A + B = 1.

Note: Any mathematician operating in any base system (quaternary, octal, decimal, hexadecimal, etc…) could have written this solution, provided we assume the following: (1) the mathematical culture has achieved positional notation with a zero numeral as a placeholder. This is required to accommodate the strings “100” and “101.” (2) The culture’s base system has at least four numerals: base 4 or higher. This accommodates the four distinct numerals A, B, C, and D. (3) The culture uses the following typographical glyphs the same way we—those of us affiliated with Union College—do:

0 : zero, the identity element of addition and subtraction
1 : one, unity, the identity element of multiplication and division
= : equality
+ : addition
* : multiplication
/ : division
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Further note: This curiosity is typographical, but not vocal. Two mathematicians sharing a spoken language but not a base would pronounce the string “100” differently. We Union College types pronounce it “one hundred,” whereas an English-speaking member of the southern California Yuki Tribe would pronounce it “sixteen.” (The Yukis, who do not count on their fingers but on the gaps between them, use base 4.)

If an English-speaking Yuki mathematician conveyed this solution to us over the phone he or she would utter the words “sixteen” and “seventeen” at various moments. The vocalized solution, unsupplemented with typography because we’re using the telephone, would not make sense to our decimal ears.

About Joe Maguire: Joe Maguire (’82) is a consultant and author whose books (including Zero To Lazy Eight: The Romance of Numbers (Touchstone, 1994) and Mastering Data Modeling: A User-Driven Approach (Addison-Wesley, 2000)) about language, numbers, and metadata analysis have been reviewed favorably by The Boston Sunday Globe, The Mathematica Journal, The Data Access Newsletter, and National Public Radio. He has been a Program Manager for Microsoft, a writing instructor for Northeastern University, a process efficiency expert for the Pharmaceutical Industry, and a regular columnist for a magazine that perished before its first anniversary.

Here is this week’s problem: How many integers n, 1 ≤ n ≤ 1000, can be expressed as the difference of the squares of two nonnegative integers?

Resources for Students

Professor Peter Otto, who after three years at Union College is now at Willamette University in Oregon, wrote to announce that Willamette (along with Lewis & Clark College, Linfield College, and the University of Portland, all in Oregon) will be running an eight week REU beginning June 18 in four different research areas: 1) Number Theory: The Frobenius Problem (the Postage Stamp Problem), (2) Differential Geometry: Listening to Orbifolds and Orbigraphs, (3) Computer Science: Sensor Networks and Grid Computing, and (4) Algebra: Algebraic Geometry and Finite Group Theory. Interested students should visit http://www.willamette.edu/cla/math/REU-RET/ and note that applications are due April 6, 2007.