TCU Math News Letter

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Real education must ultimately be limited to those who insist on knowing, the rest is mere sheep-herding.

- Ezra Pound

Editor: Dr. Rhonda Hatcher and Archive of Newsletters

Professor Ze-Li Dou to Give a Parabola Talk on November 14

The TCU undergraduate mathematics club, Parabola, will have a meeting on Tuesday, November 14, 1995 featuring Professor Ze-Li Dou of the TCU Mathematics Department as the speaker. Dr. Dou's talk is entitled "An Invitation to Number Theory." Dr. Dou will discuss problems in number theory that may be easy to state but, in fact, are very difficult to solve. He will show how this phenomenon takes place, that is, how innocent sounding problems lead us astray to complicated mathematics. However, please note that the talk will be presented at a leisurely pace (starting with a quadratic polynomial), and it should be accessible even to those with only a high school algebra background.

Dr. Dou's talk will begin at 3:30 p.m. in Winton Scott Hall 145. We hope that you will be able to come to this talk and to join us for refreshments in Winton Scott Hall 171 during the half-hour preceding the talk.

TCU Research Lectureship Talk on November 7

Professor Dan Freed of the University of Texas at Austin will present a talk entitled "What Quantum Field Theory Teaches Geometers" at 4 p.m. on Tuesday, November 7, 1995. This talk will be the fifth one in the TCU Research Lectureship Schedule for 1995-1996 and the last one scheduled for the Fall 1995 semester.

Dr. Freed's talk will begin at 4 p.m. in Winton Scott Hall 145, and refreshments will be served in Winton Scott Hall 171 during the half hour preceding the talk.

Differential Geometry Course Will be Offered in Spring 1996

The TCU Mathematics Department will be offering a new course, Math 4423 Introduction to Differential Geometry in the Spring 1996 semester. Dr. Ken Richardson will be teaching the course, and it is tentatively scheduled to meet on MWF at 12 p.m.

The course description offered by Dr. Richardson himself is as follows: "Have you ever wondered about how to do geometry and calculus on curves and surfaces rather than on straight lines and the plane? If you are crying, "Yes, yes, tell me MORE!!" then you should sign up for Math 4423. In this course, you will learn about curvature of curves and surfaces, frame fields, differential forms, covariant derivatives, metrics, and geodesics. For example, geodesics are length-minimizing curves which are the analogues of straight lines on surfaces. You should have had either Linear Algebra or Calculus III before taking this course."

If you interested in learning more about this course, you should talk to your advisor or Dr. Richardson. The course is not listed in the Advance Registration book, so be sure to remember this course when making a schedule for Spring.

Solution to the October 1995 Problem of the Month

Find all pairs of integers x and y for which xy = 2x + 3y + 1995.

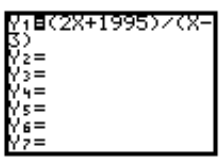
Solution: The following solution to last monthÕs Problem of the Month is due to Shirley T. Deeter. The problem was also solved by Adam Zerda. Solve the equation xy = 2x + 3y + 1995 for y in terms of x.

$$y = \frac{2x + 1995}{x - 3} = 2 + \frac{2001}{x - 3}$$

by long division. Observe that y can be a positive integer if and only if x-3 is a positive divisor of 2001. The positive divisors of 2001 are 1, 3, 23, 29, 69, 87, 667 and 2001. Hence, x equals 4, 6, 26, 32, 72, 90, 670 and 2004, with corresponding values of y equal to 2003, 669, 89, 71, 31, 25, 5 and 3, respectively.

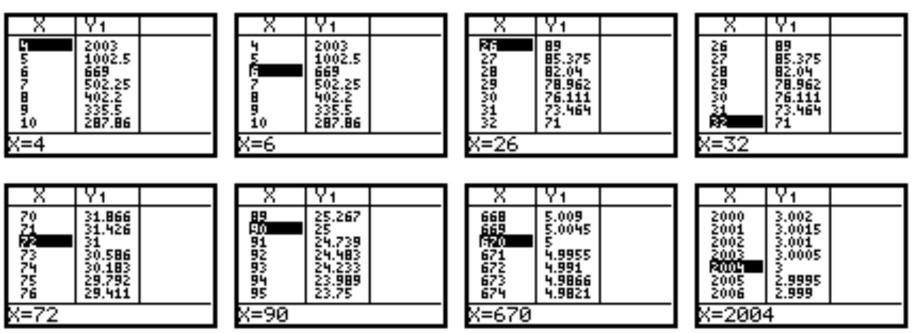
Shirley Deeter also provided the following solution for you calculator junkies (thanks to Charlie Deeter for the graphics): Solve the equation for y in terms of x, as above.

Enter this function as Y_1 in the TI-82 function editor [Y=] .



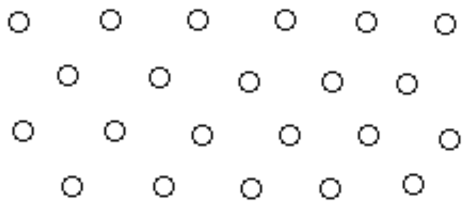
Use [TblSet] :

Scroll through [TABLE] and record all x,y pairs which are integers. That is,



Problem of the Month

This month's Problem of the Month is due to Ken Richardson. Consider the following idealized version of the ring toss at the State Fair. Rings of (inside) radius are tossed onto a large surface with many cylindrical pegs of (outside) radius r, r < R. The pegs are laid out in an array of equilateral triangles with distance d, d > 2R + 2r, between the centers of nearby pegs. (See the illustration below of a small part of the surface.) Assuming the rings drop vertically and "randomly," what is the probability of a ring being tossed onto a peg, in terms of R, r, and d?



Students and others are invited to submit solutions to Dr. George Gilbert (Math Dept. Office or P.O. 298900). Correct solutions submitted by persons who are not members of the TCU math faculty will be acknowledged in the next issue of the newsletter. Note that a correct solution is an answer and a justification of its correctness. The solution to the problem will be published in the next edition of the newsletter.

The TCU Math Newsletter will be published each month during the academic year. Dr. Hatcher: Editor; Dr. Gilbert: Problem Editor; Dr. Doran: Thought of the Month Editor. Items which you would like to have included should be sent to Dr. Hatcher via e-mail.