TCU Math News Letter

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Reason's last step is the recognition that there are an infinite number of things which are beyond it.

- Blaise Pascal

[Editor: Dr. Rhonda Hatcher](#) and [Archive of Newsletters](#)

Kris Garrett Named Mathematics Department Senior Scholar

Kris Garrett has been selected as the TCU Mathematics Department Senior Scholar for 2005. He will receive this honor at the TCU Honors Banquet on April 7.

Kris graduated from TCU in December 2004. Next year, he plans to begin work on a Ph.D. in mathematics at Purdue University.

TCU Calculus Bee On Wednesday, April 13

This is a reminder that the TCU Calculus Bee will be held on Wednesday, April 13 at 5:30 p.m. There is still time to sign up in the Mathematics Department office in Tucker Technology Center 206.

The bee will be held in TTC 244, and refreshments will be served in TTC 300 at 5:00 p.m.

Student Research Symposium

The TCU Student Research Symposium (SRS) will be held on Friday, April 22, 2005. The purpose of the Student Research Symposium is to showcase both undergraduate and graduate science research in a relaxed, interdisciplinary setting. The posters will be on display in the Tucker Technology Center all day. Students will appear with their posters in the afternoon, during which time a judging panel will evaluate the projects.

TCU mathematics major Amy Stephenson will be present her project, "Correspondence between invariants of graphs and matrices," at the symposium.

At 5 p.m. Professor Talet Raman of Kansas State University will present a lecture on nanotechnology in Sid Richardson Lecture Hall 1.

Awards for the symposium will be announced at 6:00 pm. after the lecture, followed by a small reception outside lecture hall.

Solution to the March 2005 Problem of the Month

Problem: In a Texas hold'em poker game, each player gets two cards, which they combine with five shared community cards to make the best five-card hand. If Player A has the ace of spades and ace of diamonds, Player B has the queen and jack of hearts, and so far (after the "flop") the community cards are the ten of clubs, the nine of clubs, and the three of hearts. Who is favored to win, and by how much, after the final two community cards are dealt?

Solution: Player A is favored with probability of winning 125/198. There are 45 cards left in the deck and $\binom{45}{2} = 990$ ways to deal the final two cards. One way Player B can win is by getting two queens, two jacks, or a queen and a jack, for three of a kind or two pair. Six queens and jacks remain in the deck, so there are $\binom{6}{2} = 15$ ways to do this, with probability 15/990. By getting a king or eight, Player B wins with a straight or perhaps even a flush. The first card will be a king or 8 with probability 8/45=176/990. The first card will not be a king or eight but the second will with probability (37/45)(8/44)=148/990. Finally, Player B could get a flush that does not include the king or eight of hearts in $\binom{8}{2} = 28$ ways. However, Player B will still lose if the hearts are the ace and either the ten or nine, which would give Player A a full house. Thus, the additional probability Player B wins with a flush is 26/990. Therefore, Player A's probability of winning is

$$1 - \frac{15 + 176 + 148 + 26}{990} = \frac{125}{198} \approx 0.6313.$$

This month's problem was correctly solved by Nathan Wenneker.

April 2005 Problem of the Month

Find the area of the region that satisfies the inequalities $x^2 + y^2 \le 25, \ x \ge 3 \ y \ge 3$.

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 (Math Dept. Office or P.O. 298900).