*It is a great nuisance that knowledge
can only be acquired by hard work.*
— W. Somerset Maugham

November Parabola Meetings

Professor George Gilbert will present the talk "Final Jeopardy! Wagering" to Parabola, the TCU undergraduate mathematics club. The talk should be of interest to fans of the game show Jeopardy! and to anyone interested in games of strategy. Dr. Gilbert will present the talk on Tuesday, November 9 at 3:30 p.m. in Winton Scott Hall 145, with refreshments at 3:00 p.m. in Winton Scott Hall 171.

Parabola will also host a talk presented by Professor Efton Park. This talk is entitled "Knots So Difficult." The talk will assume no knowledge of knot theory and, as the title indicates, it should be accessible to all TCU mathematics students. It will be held on Tuesday, November 30 at 3:30 p.m. in Winton Scott Hall 145, and refreshments will be served at 3:00 p.m. in Winton Scott Hall 171.

All TCU students are invited to attend meetings of Parabola, whether or not you are a member. If you are interested in joining Parabola, see Dr. Rhonda Hatcher.

Professor Robert Gompf to Give Lectureship Talk

Professor Robert Gompf of the University of Texas at Austin will be the next speaker in the TCU Research Lectureship series. He will present the talk "Exotic Four Manifolds" in Winton Scott Hall 145 at 4:00 p.m. on Tuesday, November 16.

Students, faculty, and other members of the community interested in mathematics are invited to attend the lecture and to join us for refreshments at 3:30 p.m. in Winton Scott Hall 171.

Graduate School Information

If you are a mathematics major and are interested in pursuing a graduate degree in mathematics, you should be aware that the deadlines for application to many graduate schools are in early January and the deadlines for many scholarships are even earlier.

Most graduate programs in mathematics require applicants to take the GRE (Graduate Record Examination). The test dates for this academic year are Dec. 11, Feb. 5, April 9, and June 4. You can sign up to take the GRE at the TCU Counseling and Testing Center (call X7863 for information). Applicants are also required to have three or four letters of recommendation, and it is best to have them written by your mathematics professors. Other requirements and application forms can be obtained by writing to the specific institutions.

Most qualified mathematics graduate students receive substantial financial aid, and this aid is usually not need-based. Tuition is usually waived and students receive stipends which cover living expenses. Financial aid is often given in return for some part-time teaching duties. Such aid is most often awarded by the institution, but there are other outside scholarships. For example, the National Science Foundation awards Graduate Research Fellowships, which are three-year awards providing tuition and a $14,000 stipend. Steve Scott, a TCU mathematics major who graduated last spring, was awarded one last year. There are several other similar awards available, and some of the deadlines are in early November.

Dr. George Gilbert (X6061) is the TCU mathematics department contact person for graduate programs in mathematics. He has a handout for students which gives further information about applying and also includes a ranking of the leading graduate programs.

Solution to the October 1993 Problem of the Month

Problem: In honor of the World Series, this month's problem is a two-part baseball question. The first is an oldy, but goody. The second is due to Richard Friedlander and Stan Wagon and appears in the October 1992 issue of Mathematics Magazine. Two batters, Veteran and Youngster, bat against two pitchers, Righty and Lefty. (i) Show that it is possible for Veteran to have a higher batting average than Youngster versus Righty, a higher batting average than Youngster versus Lefty, and yet have a lower combined batting average versus the two pitchers. (ii) Is it possible to have the situation in (i) and simultaneously have Veteran hit for a lower average versus Righty than versus Lefty, Youngster hit for a lower average versus Righty, and the hitters have a lower combined batting average versus Lefty?

Solution:

(i) It suffices to produce an example. Suppose Veteran has 20 hits in 80 at bats for a .250 batting average versus Righty, and is 8 out of 20 for a .400 average versus Lefty, for a .280 overall average. If Youngster is 12 out of 50 for a .240 average versus Righty and 18 out of 50 for a .360 average versus Lefty, then Youngster's overall average of .300 is higher than Veteran's.

(ii) This situation is impossible. Let h_{VR} and b_{VR} be the number of hits and at bats for Veteran versus Righty, and so forth. Then,

(1) $h_{VR} / b_{VR} > h_{YR} / b_{YR}$

(2) $h_{VL} / b_{VL} > h_{YL} / b_{YL}$

(3) $(h_{VR} + h_{VL}) / (b_{VR} + b_{VL}) < (h_{YR} + h_{YL}) / (b_{YR} + b_{YL})$

(4) $h_{VR} / b_{VR} < h_{VL} / b_{VL}$

(5) $h_{YR} / b_{YR} < h_{YL} / b_{YL}$

(6) $(h_{VR} + h_{YR}) / (b_{VR} + b_{YR}) > (h_{VL} + h_{YL}) / (b_{VL} + b_{YL})$.

If $h_{VR} / b_{VR} \geq h_{YL} / h_{YL}$, then

$$(h_{VR} + h_{VL}) / (b_{VR} + b_{VL}) \geq h_{VR} / b_{VR} \geq (h_{YR} + h_{YL}) / (b_{YR} + b_{YL}),$$

which contradicts (3). Similarly, if $h_{VR} / b_{VR} \leq h_{YL} / b_{YL}$, then (6) is contradicted.

Problem of the Month

This month's problem was suggested by Dr. Ken Richardson: Can two non-congruent regular polygons have the same area and the same perimeter. (A polygon is regular if it has equal sides and equal angles.)

Students and others are invited to submit solutions to Dr. George Gilbert (Math Dept. Office or P.O. 32903). 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.