

Vision - Potential

Vision Within Every Instructor - Potential Within Every Student

Newsletter of the HBCU College Algebra Reform Consortium*
Number 51, November 2003

www.ContemporaryCollegeAlgebra.org

Contents

- [1] 2003 Retreat
- [2] Fun Problem
- [3] Fun Project: "Into Thin Air"
- [4] Fifth Edition
- [5] Notices

[1] 2003 Retreat

Cy-Fair College in Northwest Houston, Texas, was the site of the eighth annual Retreat for persons involved in the Contemporary College Algebra program. Activities began Thursday evening with a pizza supper and Don Small's partially successful bridge loading project using a piece of spaghetti and pennies to simulate the bridge and load weight. A discussion outlining the development of the Contemporary College Algebra program over the past seven years highlighted its leading role in the national movement to refocus college algebra. Attention was called to the combined efforts of the MAA, AM-ATYC, and NCTCM in the movement. Alex

* Supported by the National Science Foundation and the U.S. Military Academy.

Fluellen (Clark Atlanta University) opened the program Friday morning reading the *Hymn of Praise*, a hymn that embodies our vision. Elizabeth Nicoli-Suco (Miami-Dade College) along with Sita Ramamurti and Laurie Johnson (Trinity College, DC) presented their "Favorite Problems." A session on

"Favorite Projects" followed with Paul Dirks (Miami-Dade College), Alex Fluellen (Clark Atlanta University), and Dorothy Hunter (Huston-Tillotson College). Both sessions generated lively discussions that identified several other favorites.

Following lunch, participants moved into a computer lab to *play* with an (almost) completed CD that will accompany the fifth edition of our text (due out in January 2004). Next on the program was a talk by Dr. Harriet Howard-Lee Black, a biologist at Prairie View A & M University. She spoke of the role of college algebra in supporting the biology program, emphasizing, in particular, the importance of students being able to plot and interpret plots. Dr. Vera King, also of Prairie View A & M University, then discussed "Best Practices in Teaching Mathematics" and teacher preparation in the state of Texas including the state mandated certification and proficiency examinations. Following the afternoon break, Dr. King led a lively discussion on assessment. Then, continuing the introductory aspect of our program, Dr. Muchere Russ (Professor of Chemistry and Chair of the Division of Natural Sciences, Huston-Tillotson College) discussed the importance of college algebra in the sciences. The afternoon program finished with participants forming teams of two to develop Fun Projects for our course.

Saturday's program began with presentations

of the teams projects—a fun, interesting, and thought-provoking session that led into a discussion of how to select groups. Some of the projects will appear in our Newsletter. Betty Travis (University of Texas, San Antonio) gave a status report on the San Antonio mayor’s initiative to reform college algebra in the nine colleges and universities located in San Antonio. A letter from Mayor Edward Garza stated

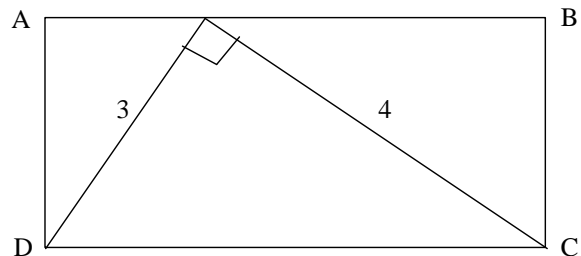
It is indicative of the emphasis that we place on education that the College Algebra alignment initiative is being developed in response to San Antonio’s economic development master plan, SA INC. Specifically, Strategy 2.2(1) calls for efforts to align curricula within and among schools and with the needs of driver-industry employers. Math and science skills are particularly important for San Antonio’s high-tech companies, but the algebra initiative will also serve as a pilot for other curriculum areas. These goals were set within an overall context that promotes market-responsive economic development, job training, and education initiatives.

The strong political backing supported by economic concerns provides opportunities for refocusing college algebra in the city of San Antonio. Saturday’s program concluded with a far ranging discussion on small-group projects and Don Small presenting problems that contrasted the traditional approach to the Contemporary College Algebra approach. Student growth in the academic as well as in the personal sense was a common thread that ran through all of the sessions of the Retreat. In addition to those

already mentioned, the participants included Cameron Cooper (Ft. Lewis College), Joel Williams (Houston Community College, Central Campus) Bill Echols (Houston Community College, Northeast Campus), Firooz Khosraviyani and Terutake Abe (both of Texas A & M International University), and, with very special thanks, Laurette Foster, who organized the Retreat.

[2] Fun Problem

Determine the area of the rectangle ABCD shown here. Clearly explain your reasoning.



Follow-on Problem. Determine the area of the rectangle ABCD when the inscribed triangle is an equilateral triangle with side 5 cm.

[3] Fun Project: “Into Thin Air”

Submitted by

Sita Ramamurti and Laurie Johnson
Trinity College D.C.

Mountain climbers experience that both air pressure and oxygen levels decrease as altitude increases, as the following chart indicates. Less obvious is the relation between air pressure and oxygen. In this Fun Project, you are asked to explore this relation of modeling oxygen as a function of air pressure by 1) first modeling altitude as a function of air pressure and 2) second modeling oxygen as a function of altitude, then 3) third composing the two models. (In the following chart, altitude is measured in feet, air pressure in inches of mercury, and oxygen level as percentage of blood saturation.)

Altitude	Air Pressure	Oxygen Level
0	29.92	96
3,000	26.82	
5,000	24.89	92
8,000	22.22	89
10,000	20.57	85
12,000	19.02	83
14,000	17.57	
15,000	16.88	75
18,000	14.94	71
20,000	13.74	65
25,000	11.10	50
30,000	8.89	
35,000	7.04	20
50,000	3.43	

[4] Fifth Edition

The fifth edition of Contemporary College Algebra: Data, Functions, Modeling, McGraw-Hill Primus Custom Publishing, will be available January 1, 2004 in time for spring semester. A CD containing multiple activities for each section will be included with each text. Additional changes in the new edition include a new section on optimization, an index, and new exercises. The inclusion of a section on optimization, is further evidence of how technology is affecting the curriculum. Optimization, finding maximum and minimum values of a function, used to be the purview of Calculus I. Today it is a topic for a college algebra course. Graphing calculators provide the capability to graphically approximate maximum and minimum values using the trace feature. In addition, many graphing calculators have built-in programs to compute maximum and minimum values. The existence of technology changes optimization problems from computation exercises into modeling problems.

The ISBN number for the fifth edition is 007-2994061. Contact Christine Bowie, McGraw-Hill Custom Publishing, for examination and/or desk copies—phone (919) 556-8000 or (800) 228-0634 ext 2785; Fax (919) 556-8876; e-mail Christine_Bowie@mcgraw-fill.com.

Complete the following.

1. Describe, in your own words, the relationship between air pressure and oxygen level.
2. Model oxygen as a function of altitude, $O(a)$, by plotting the appropriate data and fitting a curve to the data.
3. Model altitude as a function of air pressure, $A(p)$, by plotting the appropriate data and fitting a curve to the data.
4. Plot both models and then approximate the oxygen level when the air pressure is 10 inches of mercury.
5. Compose the oxygen model with the altitude model. Hint: $O(A(p))$.
6. Evaluate $O(A(p))$ when air pressure is 10 inches of mercury and compare your result to the result in Step 4. Explain any differences.
7. Investigate the effects of altitude on the human body and write a paragraph or two describing the results of your investigation.

[5] Notices

1. Deadline for contributions to the January Newsletter is Monday, January 5, 2004. Opinion articles, suggestions for writing assignments, small group in-class activities, small group out-of-class projects, Queries, announcements, etc. are welcomed.

2. AMATYC Meeting, Salt Lake City, UT, November 13-16, 2003. Panel “Tribal College Algebra Project: Re-tooling the College Algebra Course.” Moderator: Bob Johnke (Stone Child College); Panelists: Russ Lundgren (Chief Dull Knife College), Grace Wood (Ft. Peck College), Dianna Hooker (Little Big Horn College).
Talk “Group Activities and Projects in College Algebra,” Don Small (U.S. Military Academy).
3. Joint Mathematics Meetings, Phoenix AZ, January 7-12, 2004. Several sessions addressing change and refocusing college algebra. In particular,
 - (a) Panel “Assessment in a Refocused College Algebra Program”
Moderator: Norma Agras (Miami-Dade College)
Panelists: Paul Dirks (Miami-Dade College), Laurette Foster (Prairie View A & M Univ.), Bruce Crauder (Oklahoma State Univ.)
 - (b) Panel “How to Implement Curriculum Change”
Moderator: Gary Krahn (U.S. Military Academy)
Panelists: Mike Moody (Olin Univ.), Steve Maurer (Swarthmore College), Jeff Floyd (Texas A & M Univ.)
 - (c) Panel “Open Discussion on Beginning Level Courses”
Moderator: Jack Bookman (Duke Univ.)
Panelists: Norma Agras (Miami-Dade College) and Bob Mayes (West Virginia Univ.)
 - (d) Poster Session “Contemporary College Algebra: Data, Functions, Modeling” arranged by Dorothy Hunter (Huston-Tillotson College); “Tribal College Algebra Project” arranged by Russ Lundgren (Chief Dull Knife College).
4. To subscribe to this Newsletter, write to Don Small, Dept. of Mathematics, U.S. Military Academy, West Point, NY 10996 or contact him via e-mail at don-small@usma.edu.