

Vision - Potential

Vision Within Every Instructor – Potential Within Every Student

Newsletter of the HBCU College Algebra Reform Consortium*

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[1] **Local Coordinators Meeting**
HBCU College Algebra Reform Consortium
Della Bell
Texas Southern University

The HBCU College Algebra Reform Consortium Local Coordinators' Meeting was held 3:00 - 5:00 p.m. Friday, January 12, 2001 in the Pontchartrain Room F, Sheraton Hotel, New Orleans, LA. The meeting was held in conjunction with the Joint

* Supported by the EXXON Education Foundation and the U.S. Military Academy.

Mathematics Meetings of the Mathematical Association of America and the American Mathematical Society. Individuals present included Stacy Jones, Mohamad Nickraves, and Fereshteh Zahed, Benedict College; Alex Fluellen, Clark Atlanta University; Russ Lundgren, Dull Knife Memorial College; Eugene Taylor, Grambling State University; Lateef Adelani, Harris Stowe State College; Joel Williams, Houston Community College Central Campus; William Echols, Houston Community College Northwest; and Dorothy Hunter and General Marshall, Huston-Tillotson College. Also in attendance were Don Smith, Morris Brown College; Casimir Uchegbu, Philander-Smith College; Phillip McNeil, Norfolk State University; Laurette Foster and Vera King, Prairie View A&M University; Della Bell, Carrington Stewart, and Victor Obot, Texas Southern University; Don Small, U.S. Military Academy; and Sarah Bush, Wiley College.

Agenda items for the meeting included the following: (1) introduction of the persons present; (2) reports from the Local Coordinators on College Algebra Reform Activities implemented during the fall semester 2000 and sharing of group projects from selected schools; (3) report from Project Evaluator, Bill Echols on progress of the College Algebra Reform Program; and (4) administration of survey forms to participants. College Algebra Consortium members participated in other activities while attending the Join Mathematics Meetings.

Laurette Foster, Dorothy Hunter, and Don Small conducted a mini-course on the Contemporary College Algebra Program; Alex Fluellen and Don Small were panelists on the discussion “Redefining College Algebra Courses.” Dorothy Hunter, General Marshall, and Della Bell participated in two poster sessions - one on College Algebra Projects and the other on recently funded National Science Foundation projects. Della Bell and Sarah Bush were panelists for the MAA Open Discussion on Reforming College Algebra. Don Small was the organizer of several sessions on College Algebra, the Core Curriculum, the INTERMATH program, and Implementing Change. Jackie Giles was a participant in several NAM Committee Meetings as well as several MAA subcommittee meetings.

All participants benefited from attending the various scheduled sessions, viewing the exhibits, attending mini-courses, and other meetings of special interest groups.

[2] Clippings from *Focus*

The following passages are quoted from the article “Abandoning Dead Ends: Embracing Lively Beginnings” by Edward B. Burger and Michael Starbird that appeared in the December Issue of *Focus*, the Newsletter of the Mathematical Association of America.

“Part of the power of mathematics lies in its inexorable quest for elegance, symmetry, order, and grace. Seeking pattern, order, and understanding is a transforming process that mathematics can help students develop. These and other strategies of thinking that have led to great ideas in mathematics can have their greatest value to people making real-life decisions and facing situations that are completely outside mathematics. It is a crime for any student to leave a mathematics course with the impression that mathematics is a collection of mindless, rote procedures.”

“Somehow, we must invite our students to answer

questions and not be afraid to make mistakes. Failing is the only way to learn. It is much better to guess a wrong answer than not to think about the question at all. But that idea is one that requires acculturation and must be built into the method of instruction. It is not in keeping with most of their [students] mathematical experience. In short, failure must be encouraged.

Top 10 Lessons for Life

1. Just do it.
2. Make mistakes and fail, but never give up.
3. Keep an open mind.
4. Explore the consequences of new ideas.
5. Seek the essential.
6. Understand the issue.
7. Understand simple things deeply.
8. Break a difficult problem into easier ones.
9. Examine issues from several points of view.
10. Look for patterns and similarities.”

**[3] Averaging Height-Weight Ratios,
A Small Group Activity**

In this activity, students collect height and weight data of its members, compute averages, and compare the average of the individual height-weight ratios of its members to the ratio of the average height to the average weight. In the process, an important property of adding fractions is brought to light. Each group does the following:

- a. Make a three column table with the column headings being: height (inches), weight (lbs), height/weight. Each member fills in a row of the table.

- b. Compute the average of each of the three columns.
 - c. Is the average of the height/weight column equal to the (average height)/(average weight)? Should it be? Explain your reasoning.
- c. Repeat “a” with the additional requirement that the resulting box have the shape of a cube. This probably means that a piece of the cardboard must be cut off in addition to the rectangular corners that are cut out.

It would be interesting (and informative) to have two groups debate part c. (That is, one group argue that the average of the height/weight column should be equal to the (average height)/(average weight) and the other group that the two quantities are not equal.)

[4] NASCAR Racing

Late last fall, Jeff Gordon beat out Mark Martin by 0.241 seconds to win the Busch Grand National in the Miami 300. Jeff Gordon’s speed for the 300 mile race was 125.450 mph. Compute Mark Martin’s speed in the 300 mile race.

[5] Generalizations on Constructing a Box, A Small Group Activity

The first of the following problems is a standard activity in reformed college algebra courses. Problems two and three are interesting generalizations that require students to think a bit deeper. All three problems start with an 8.5” x 11” piece of cardboard. Students should use their graphing calculators to plot their volume function and then use the Trace and Zoom features to identify the highest point on the plot.

- a. Determine the maximum possible volume of an open box (no lid) that can be formed by cutting out rectangles from each corner of the cardboard and then folding up the sides. What are the dimensions of the rectangles (that are cut out)?
- b. Repeat “a” with the additional requirement that the resulting box have a square bottom. This probably means that a piece of the cardboard must be cut off in addition to the rectangular corners that are cut out.

**[6] Ten Commandments for Teaching
George Polya**

George Polya’s book *How To Solve It* , Princeton 1945, is one of the most popular books among mathematics instructors who emphasize developing students to become confident, competent, and creative problem solvers. In 1965, Polya enumerated his following Ten Commandants for Teaching.

1. Be interested in your subject.
2. Know your subject.
3. Know about the ways of learning: The best way to learn anything is to discover it by yourself.
4. Try to read the faces of your students; try to see their expectations and difficulties, put yourself in their place.
5. Give them not only information, but “know-how” attitudes of mind, the habit of methodical work.
6. Let them learn guessing.
7. Let them learn proving.
8. Look out for such features of the problem at hand as may be useful in solving problems to come - try to disclose the general pattern that lies behind the present concrete situation.
9. Do not give away your whole secret at once - let the students guess before you tell it - let them find out by themselves as much as feasible.

10. Suggest it, do not force it down their throats.

[7] **Housing Market
Orange County, NY**

Orange County, NY lies about 50-80 miles north of New York City. The housing market there for single family homes has been impacted positively as the housing boom sparked by the growth of New York City has spread outward from the City. The following table lists the average sales price of single family homes in Orange County. (Source: Orange County Association of Realtors)

<i>Year</i>	<i>AverageSalesPrice</i>
1996	\$134,540
1997	\$143,865
1998	\$151,694
1999	\$159,608
2000	\$174,019

Predictions of a slowing economy raises questions as to whether the rate of increase in sale prices of single family homes can be sustained. In particular, the National Association of Home Builders has predicted a 6% slowdown in the market.

Develop a prediction for the average price of a single family house in Orange County, NY for 2001 by doing the following:

- a. Plot the preceding data.
- b. Graphically fit a line to the data.
- c. Predict the average sales price for 2001 taking into account the prediction of the National Association of Home Builders.

One of the factors for increases in the price of houses is the increasing size of houses. The average single family house expanded in size from 1,800 sq. ft. in 1987 to 2,500 sq. ft. in 2000. Assuming the rate of increase in the size of houses was constant over the 1987-2000 period, add a third column to

the preceding data table giving the average house size. Make a fourth column giving the sales price per square foot. Compare the rate of growth (that is, slope) of the sales price to the rate of growth of the sales price per square foot.

[8] **Notices**

1. A workshop on teaching the Contemporary College Algebra program will be held at Benedict College, Columbia, SC on February 23-24, 2001. For information, contact Stacy Jones, Chair, Department of Mathematics, Benedict College, Columbia, SC 29204.
2. The Third Edition of the *Contemporary College Algebra* text is now available from McGraw-Hill Publishing Co. Examination copies can be obtained by by contacting: Regional Sales Office, Glencoe Sales Division/McGraw-Hill, Woodland Hills, California 91367 or calling 1-800-423-9534. A Teacher's Guide can be obtained by contacting Don Small don-small@usma.edu.
3. The Deadline for contributions to the March Newsletter is Monday, March 5, 2001.
4. To subscribe to this Newsletter or to submit articles write to Dr. Della Bell, Chair, Dept. of Mathematics, Texas Southern University, 3100 Cleburne St., Houston, TX 77004.

To teach effectively a teacher must develop a feeling for her subject, she cannot make her students sense its vitality if she does not see it herself. She cannot share her enthusiasm when there is no enthusiasm to share. How she makes her point may be as important as the point she makes, she must personally feel it to be important.

Mathematical Discovery, New York,