

Vision - Potential

Vision Within Every Instructor – Potential Within Every Student

Newsletter of the HBCU College Algebra Reform Consortium*

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- [1] **Sixth Annual Retreat, HBCU Consortium for College Algebra Reform**
Dr. Della Bell
Texas Southern University

The HBCU College Algebra Reform Consortium Sixth Annual Retreat was held September 27-29, 2001, Wiley College, Marshall, Texas. Dr. Marian Elbert, Dean of Wiley College, opened the Retreat by extending a warm welcome to each of the participants. Activities of the Retreat included

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

a Calculator Session for participants led by Sarah Bush; several Mathematical Modeling problem solving sessions in which participants worked in pairs, led by Don Small; and several presentations. The presentations made were as follows: “The Use of Technology,” Mr. James Strickland (Dept. of Education, Wiley College); “The Value of a Dollar,” Mr. Salem (economist, Wiley College); discussion on “Quantitative Literacy” and, a position paper on “College Algebra,” Alex Fluellen; “Testing,” by Laurette Foster; and “Projects Suitable for College Algebra and Statistics Classes” by Joel Williams. Della Bell discussed research results on the Effectiveness of the College Algebra Program over the following semesters: the Fall 1999, Spring 2000, Fall, 2000 and Spring, 2001. Laurette Foster administered the annual evaluation survey designed by William Echols. Sarah Bush was the Local Coordinator for the program.

Retreat participants included Alex Fluellen, Clark Atlanta University; Russ Lundgren, Dull Knife Memorial College; Joel Williams, Houston Community College Central Campus; Dorothy Hunter and Maryam Fatehi, Huston-Tillotson College; and Laurette Foster, Prairie View A & M University. Also in attendance were Della Bell and Victor Obot, Texas Southern University; Elizabeth Suco and Paul A. Dirks from Miami-Dade Community College; Don

Small, United States Military Academy; and Sarah Bush, Wiley College.

The Retreat activities were very meaningful and provided additional problems and ideas useful in the implementation of the Contemporary College Algebra Program. The Retreat was financially supported by the National Science Foundation.

[2] The Cost of Driving

Many factors are involved in determining the cost per mile to drive an automobile. Some of the costs are monthly, such as car payments, some are annual or semi-annual such as the cost of insurance, some are immediate such as paying for tires or fuel, and some stretch over (your) life of the vehicle such as depreciation and distance driven.

Suggested In-class Activity:

- a. Ask the class for a show of hands on how many drive. Ask the class to estimate the per mile cost of driving your own vehicle. Write the estimates on the board and then ask someone to compute the average which will be considered the class estimate.
- b. Ask the class to identify the factors involved in determining the cost per mile of driving. List these factors on the board.
- c. Partition the class into small groups, ask each group to estimate the cost of each factor listed on the board, and then to determine the corresponding cost per mile of driving.
- d. Ask the groups to report their results. Write the results on the board and then ask some students to compute the average for each of the factors as well as for the final cost per mile. Compare the computed average cost to the estimated average cost.
- e. Interpret the results: How realistic were the group estimates? What is the most expensive factor? What percentage of the cost per

mile is represented by the cost of fuel? What percentage of the cost per mile is represented by insurance?

[3] Losing Air Pressure

Suppose you run over a nail that punctures a tire on your car. As air seeps out the hole, the air pressure in the tire decreases. What is the shape of the graph of air pressure versus time for your punctured tire? Consider the following three graphs. Determine the one which would best represent the air pressure versus time graph of your tire as it goes flat. Write an explanation explaining why your choice is more realistic than the other two choices.

[4] A Writing Assignment

A study of a group of people with respect to weight, height, and age is summarized in the following statements. For each statement, you are asked to draw one or more conclusions and then write a paragraph justifying your conclusion(s).

- a. The average weight is less than the medium weight.

- b. The average height is larger than the median height.
- c. The median age is greater than the average age.

Although not applying to this group of people, the researchers asked that you answer (with an accompanying written justification) the question: “If you know that the mode of the weights of a group of people is the weight of the heaviest person, can you establish a relationship between the median and average weights?”

**[5] Interview with Dr. Raymond Brown,
Professor and Interim Chair,
Department of Physics
Clark Atlanta University
Conducted by Alex Fluellen**

This is the second of a sequence of interviews with faculty in partner disciplines discussing the role of College Algebra in their disciplines. Dr. Alex Fluellen of Clark Atlanta University conducted this interview.

Questions:

1. Why is College Algebra required for majors in your discipline?

Response: The (physics) department provides service courses for students whose majors are biology, chemistry, and psychology. These students take a two-part general physics course that is not calculus based. It requires a strong background in algebra and trigonometry. We also offer a general physical science course to satisfy the science liberal arts requirements for students not majoring in the sciences. The student must have skills in algebra and basic trigonometry for this course. All physics and science majors must have excellent algebra skills to do the calculus in their physics course work.

2. How are skills obtained in College Algebra used in your discipline?

Response: The study of systems of linear equations, quadratic equations, inequalities, and the elementary algebra of vectors are very useful in helping students understand the dynamics of physical systems. Order relations, variable relationships, ordered pairs and functions are also useful in describing physical systems. Students need to know how to graph and interpret data. These skills are critical to understanding results from physical investigations in the laboratory.

3. What do you expect students to know and be able to do after taking College Algebra?

Response: Students should be able to apply their algebra skills in solving problems. They should be able to develop problem solving models for solving problems in the physics class. They should be able to display and graphically interpret data. They should be able to make quantitative approximations to physical observations and know when they make sense.

[6] Fun Activity with Fruit Loops

A box of Fruit Loops offers several hands-on, small group activities for displaying, interpreting, and analyzing data. Parts of the following activity were done at the Fall Retreat of the HBCU Consortium for College Algebra Reform. The equipment needed consists of cups (one for each group), one or more individual serving boxes of Fruit Loops (15/16 ounce), a large box of Fruit Loops, graph paper, and a few protractors.

Suggested activities (instructors are encouraged to modify these activities):

- a. Compare the distribution by color of Fruit Loops in an individual serving box to the distribution by color of Fruit Loops in a large box.

Partition the class into small groups. Give each group either an individual serving box of Fruit Loops or one cup of Fruit Loops. (One cup of Fruit Loops weighs one ounce.) Each group determines the distribution by color of one ounce of Fruit Loops. (That is, each group counts the number for each color.) Each group computes for each of the colors, the percentage of Fruit Loops in their sample of that color.

Record the results of each group on the board. Ask some students to compute the averages for the individual serving box samples and other students to compute the averages for the sample taken from the large box.

Discuss the results: Is the distribution by color in the individual serving boxes the same as in the large box? Do all of the colors have approximately the same percentage? (If not, why not?) What factors do you think determined the colors? (Note, there are no black Fruit Loops.) How many Fruit Loops are there in a large box? In a case?

- b. Each group displays their distribution using a bar chart, pie chart, and scatter plot. Discuss topic: Does it make sense to display a distribution using a line chart? Why or why not?

[7] A Mysterious Algorithm

Iterate the following algorithm:

- a. Pick a positive integer, call it x .
- b. If x is an odd integer, replace x with $3x+1$. If x is an even integer, replace x with $\frac{1}{2}x$.
- c. Repeatedly apply step b until the number one is obtained.

Will the sequence of integers generated by this algorithm always converge? Explain. Will the iterations eventually yield 2^k for some integer k ? Explain.

[8]

Notices

1. Dr. Laurette Foster will participate in a panel at the ICTCM meeting in Baltimore, MD, November 1-4, 2001 on first year mathematics courses. She will discuss the Contemporary College Algebra program.
2. Drs. Della Bell and Don Small will participate in the AMATYC national conference in Toronto, Canada, November 15-17, 2001. Dr. Bell will present a poster display of the Contemporary College Algebra program and Dr. Small will present a talk on reforming College Algebra.
3. Don Small will participate in the national conference on "Quantitative Literacy: Why Numeracy Matters for Schools and Colleges," sponsored by the National Council on Education and the Disciplines, December 1-2, 2001.
4. The HBCU Consortium for College Algebra Reform will host a national conference on reforming College Algebra, February 7-10, 2002. The Conference will be held at the U.S. Military Academy, West Point, NY.
5. The next issue of the *Vision - Potential* Newsletter will appear in November 2001. The Deadline for contributions to the October Newsletter is Monday, November 5, 2001. Opinion articles, suggestions for writing assignments, small group in-class activities, small group out-of-class projects, Queries, CBL activities, announcements, and so on are welcomed. Please send material to Dr. Della

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