

# *Vision - Potential*

*Vision Within Every Instructor – Potential Within Every Student*

Newsletter of the HBCU College Algebra Reform Consortium\*

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## **[1] Thoughts on Starting a New School Year**

*Two stone cutters were asked what they were doing.*

*One said that he was cutting stones into blocks.*

*The other said that he was a member of a team building a cathedral.*

A new school year - a time of new beginnings, a time of high expectations, possibly a new location, possibly a new position, possibly new courses, probably new responsibilities, certainly new students, and new challenges. This is an exciting time by any measure. It is also a humbling time as we

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look out on new classes of students and sense their potential. It is a daunting time as we take on the challenge to unlock the potential of our students and create an environment to foster student growth. It is a time to think beyond what we have done in the past, to think “outside the box,” to create a vision, and then share it with our colleagues and students.

Margaret J. Wheatley’s book *LEADERSHIP and the NEW SCIENCE*, discussing organizational leadership, contains several passages that are beneficial for classroom instructors, Department Chairs, Deans, and administrators to ponder. For example, she decryes the boundaries to growth and the trouble we cause when we confuse “control with order.” She says (p. 25)

If people are machines, seeking to control us makes sense. But if we live with the same forces intrinsic to all other life, then seeking to impose control through rigid structures is suicide. If we believe that there is no order to human activity except that imposed by the leader, that there is no self-regulation except that dictated by policies, if we believe that responsible leaders must have their hands into everything, controlling every decision, person, and moment, then we cannot hope for anything except what

we already have - a treadmill of frantic efforts that end up destroying our individual and collective vitality.

It is interesting to translate her comments emphasizing relationships over organizational structure (p. 39) to emphasizing student growth over covering a prescribed number of chapters.

We need fewer descriptions of tasks and instead learn how to facilitate process. We need to become savvy about how to foster relationships, how to nurture growth and development. All of us need to become better at listening, conversing, respecting another's uniqueness, because these are essential for strong relationships. The era of the rugged individual has been replaced by the era of team player.

How fortunate we are to have the opportunities to engage in the mental growth of our students.

**[2] "Temperature Distribution in a Plate"**

**Roosevelt Gentry  
Jackson State University**

Problem: Consider a metal plate with temperatures held constant along the edges as indicated in the following figure. Find the temperatures at the points  $x$ ,  $y$ , and  $z$  if the temperature of each point is the average of the four nearest surrounding points. One point is used for each direction (North, South, East, West).

Solution: Let  $x$ ,  $y$ ,  $z$  denote the temperatures at those points. The expression for the temperatures at the 3 points can be modeled by the following system of 3 equations in 3 unknowns:

$$x = \frac{5 + 10 + 5 + y}{4}$$

$$y = \frac{5 + x + 5 + z}{4}$$

$$z = \frac{5 + y + 5 + 0}{4}$$

This system of equations can be simplified to:

$$4x - y = 20$$

$$-x + 4y - z = 10$$

$$-y + 4z = 10$$

There are several methods for solving this system of equations, for example: Gaussian elimination, Gauss-Jordan reduction, Cramer's rule, elimination method, and substitution method. All the methods yield  $(x, y, z) = (25/4, 5, 15/4)$ .

Check:

$$25 - 5 = 20$$

$$-25/4 + 20 - 15/4 = 10$$

$$-5 + 15 = 10$$

**[3]**

**Shopping Queries**

1. Margaret is shopping the Back-to-School sales for a new sweater. She selects a black cashmere sweater from the table marked 40% discount. If the sweater was originally priced at \$22 and the Sales Tax is 6%, how much does Margaret pay for the sweater?
2. An airlines snack included the option of a half-pint of 2% milk. The container claimed that it contained 38% less fat than whole milk. If the half-pint of 2% milk contained 5 grams of fat, how many grams of fat are there in a half-pint of whole milk?

3. Pricing of cereal is sometimes confusing. A store in Cornwall, New York sells 3 different size boxes of corn flakes of the same brand. The sizes and prices are: 12 oz. for \$2.69; 18 oz. for \$2.89; 24 oz. for \$3.99. What is the best buy in terms of price per ounce? The unit price for cereal is the price for one pound of cereal. What are the unit prices for the three different size boxes of corn flakes?

**[4] Curriculum Reform is in the Air**

The reform of college algebra is playing a significant role in the multiyear, multifaceted study of the entire mathematics curriculum. This fall and winter the following four major curriculum conferences will be held. Each involves college algebra reform.

- \* West Point Summary Conference for the eleven CRAFTY curriculum workshops held to elicit input from partner disciplines. (Reports from the Technical College workshops called for a college algebra along the lines of the Contemporary College Algebra program.)
- \* National Science Foundation Conference “Rethinking the Preparation for Calculus.”
- \* Conference on “Quantitative Literacy: Why Numeracy Matters for Schools and Colleges” to be held at the National Academy of Sciences.
- \* Conference on “Reforming College Algebra” hosted by the HBCU Consortium for College Algebra Reform.

In addition there are panels, talks, and poster sessions on the programs for the ICTCM, AMATYC, and AMS/MAA national meetings. Leaders in the Contemporary College Algebra program are important contributors to each of these conferences and meetings.

Modeling (problem solving, critical thinking, real world applications), data analysis, functions, graphical and numerical analysis, use of technology, communication skills, and interdisciplinary linkages are the major reform issues, particularly with respect to college algebra. The interdisciplinary linkages are particularly important to the development of quantitative literacy programs based on reformed college algebra programs. Input from faculty in partner disciplines, obtained through interviews and surveys, was instrumental in the development of the Contemporary College Algebra program. It is important to continue building on these contacts to obtain insight on the future needs of our students as well as providing a means of quality control for our program.

**[5] Interview with Dr. Woldie, Professor of Business, Texas Southern University  
Conducted by Dr. Della Bell  
Texas Southern University**

This is the first of a sequence of interviews with faculty in partner disciplines discussing the role of college algebra in their disciplines. Dr. Della Bell conducted this interview.

Questions:

1. Why is College Algebra required for majors in your discipline?
2. How are skills obtained in College Algebra used in your discipline?
3. What do you expect students to know and be able to do after taking College Algebra?

Responses:

- \* Students should have good quantitative skills.
- \* Students should be able to solve equations and inequalities.

- \* Students should be able to solve systems of equations and inequalities.
  - \* Students should be able to construct and interpret graphs.
  - \* Students should be able to understand economic applications involving the intersection of graphs such as equilibrium point (the point of intersection of the supply and demand curve); and the break-even point (the point at which the total revenue equals the total cost).
  - \* Students should understand functional relationships - particularly linear, quadratic, exponential, and logarithmic functions.
  - \* Students should have some understanding of maximum and minimum points and their application to business - i.e., maximizing profit and minimizing cost.
  - \* Students should be able to apply the mathematics that they have learned. They should “understand why what they do mathematically makes sense.”
  - \* Some Business courses center around Critical Thinking and Problem Solving Skills.
  - \* Many problems involving amortization require an understanding of “Geometric Progressions.”
  - \* Students should be able to manipulate formulas and not have a “fear of mathematics.”
  - \* Business Statistics I and II are required. An understanding of basic elements of descriptive statistics provides the foundation for understanding concepts in these courses.
  - \* Business faculty use technology in their courses. Skills in the use of technology acquired in college algebra are very useful.
1. Sixth annual Retreat of the HBCU Consortium for College Algebra Reform will be held at Wiley College, Marshall, TX, September 27-30, 2001. The Retreat will begin with a pizza supper at 6:00 p.m. Thursday evening and conclude with lunch on Saturday.
  2. Dr. Della Bell will participate in the National Science Foundation funded conference at Arlington, VA, October 4-6, 2001 entitled “Rethinking the Preparation for Calculus.” She will be a member of the group discussing college algebra reform.
  3. 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.
  4. 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.
  5. Don Small will present a talk “A Case for Reforming College Algebra” to the meeting of the Southeastern Section of the MAA at Miami-Dade Community College on October 5, 2001.
  6. The next issue of the *Vision - Potential* Newsletter will appear in October 2001. The Deadline for contributions to the October Newsletter is Monday, October 8, 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 Bell, Chair, Department of Mathematics, Texas

Southern University, 3100 Cleburne St., Houston, TX 77004.

7. To subscribe to this Newsletter write to Dr. Della Bell, Chair, Department of Mathematics, Texas Southern University, 3100 Cleburne St., Houston, TX 77004.