

# *Vision - Potential*

*Vision Within Every Instructor – Potential Within Every Student*

Newsletter of the HBCU College Algebra Reform Consortium\*

Number 15, October 1998

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[1] **Evelyn Boyd Granville**  
**Written by Laurette Foster**  
**and Charleen Hunter**  
**Prairie View A & M University**

Evelyn Boyd Granville was one of the first two African American women to earn a Ph.D. in mathematics. The daughter of William and Julia Walker Boyd, Dr. Granville was born May 1, 1924 in the capital of the United States and attended public schools in Washington, D.C. After graduating

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

from Dunbar High School she was awarded a partial scholarship to attend Smith College. She secured additional funds for her education from her mother and her aunt and by working summers for the National Bureau of Standards. In 1945, she graduated from Smith College summa cum laude and was elected to Phi Beta Kappa. With a desire to continue her education, she received several awards to continue her studies at Yale University. Those awards included Smith College fellowship, a Julius Rosenwald fellowship and an atomic Energy Commission fellowship. In 1946 she earned her M.A.. In 1949 she completed her Ph.D. in mathematics under the direction of the renowned Functional Analyst Einar Hille and former president of the American Mathematical Society. Additionally she was elected into the scientific honorary society Sigma Xi. The year following her graduation she worked as a research assistant at the New York University Institute of Mathematics and also taught part-time at New York University. Even though Dr. Boyd had received her Ph.D. and carried an impeccable academic record, she found it difficult to secure a position at a major university. In 1950, the students at Fisk University in Nashville, Tennessee were rewarded when Dr. Boyd joined the mathematics faculty as an Associate Professor. During the two years she spent at Fisk, she inspired two

women, Etta Falconer and Vivienne Malone Mays to pursue Ph.D.s in mathematics.

Dr. Boyd Granville changed directions and settings and became an applied mathematician. She worked for the Diamon Ordinance Fuze Laboratories and then latter with the Project Vanguard and Project Mercury programs, formulating orbit computations and computer procedures for IBM. She also worked with the Computation and Data Redictopm Center of the United States Space Technology Laboratories. She completed an illustrious career at IBM as a senior mathematician.

Returning to education, Dr. Granville joined the faculty at California State University in Los Angles. During her tenure there she co-authored a book with Jason Frand: "Theory and Application of Mathematics." In 1985 Dr. Granville and her husband Edward Granville purchased a sixteen acre farm in Tyler, Texas and she continued her teaching career at Texas College in Tyler. In 1990 she was appointed to the Sam A. Lindsey Chair at the University of Texas at Tyler and became a visiting professor at that institution.

Dr. Granville has served as a member on many boards and committees including the United States Civil Service Panel of Examiners of the Department of Commerce. She served on the examining committee of the Board of Medical Examiners, an advisory committee of the National Defense Education Act Title IV Graduate Fellowship Program of the Office of Education and the board of trustees of the Center for the Improvement of Mathematics Education. She has been active in organizations such as the National Council of Teachers of Mathematics and the American Association of University women.

Dr. Granville's accomplishments include her being the first African American woman mathematician to receive an honorary doctorate from Smith College. Dr. Granville's pioneering career and warm personality has inspired many. According to Dr. Granville, her life has been rich - she has been blessed with a fine family, received an excel-

lent education, made many wonderful friends and last but certainly not least has a wonderful marriage. Today, Dr. Granville is still active as an advocate of mathematics with our youth and her speaking engagements are sponsored by the Dow Chemical Company.

**[2] The Historically Black Colleges and Universities College Algebra Reform Third Annual Retreat**

**Della Bell**

**Texas Southern University**

The HBCU College Algebra Reform Third Annual Retreat was held at Wiley College, Marshall, Texas, October 1-3, 1998. Participants of the Retreat included Eugene Taylor, Grambling State University; Joel Williams, Houston Community College Central Campus; William Echols, Houston Community College Northwest Campus; Maryam B. Fatchi and Ahmad Kamalvand, Huston-Tillotson College; Otto Bielss, Paul Quinn College; Laurette Foster and Vera King, Prairie View A & M University; Della Bell and Carrington Stewart, Texas Southern University, Don Small, U.S. Military Academy; and Sarah Bush, Wiley College. Major agenda items for the Retreat were: (1) small group activities; (2) discussion of issues related to the field-testing of the Contemporary College Algebra textbook; and (3) project evaluation.

Two of the small group activities in which participants were involved include "the cost of fertilizing a lawn" and "purchasing an iron using data from Consumer Report magazine," led by Joel Williams. "Determining the cost of running an air-conditioner to cool a classroom for a month," was led by Eugene Taylor. Carrington Stewart led the discussion of the fourth activity entitled "How many times must I pump." This activity involved determining gear ratios of a multi-speed bicycle and developing a "bicycle function."

Don Small led the discussion of issues related to field testing of the Contemporary College Alge-

bra textbook. An evaluation report was presented by William Echols. This report involved an evaluation of activities of the HBCU College Algebra Consortium over the past two years, as well as the beginning of an evaluation for the current year.

The Retreat participants had the opportunity to meet participants of the Saturday Science Academy at Wiley College. The Saturday Science Academy participants are students from grades 4-8 who are involved in enrichment activities related to mathematics, science, and computer science. Della Bell made a brief presentation to these students on the need to become well prepared in mathematics and science in order to enhance their career choices.

The participants extended their thanks and appreciation to Sarah Bush for arranging all of the details for the Retreat, including buying herself a new bicycle for Carrington Stewart to use in his project. The Retreat was very beneficial and inspiring to participants.

[3] **Small Group Activity: Determine the Radius of an Arch Bridge**

Last June, Sam showed up at Bob Small's lumber mill with a challenging request. Sam told Bob that he wanted to build an arch bridge over a small stream in the back of his property. The desired bridge is to span 20 feet and is to be arched so that the center point is 3 feet higher than the ends. The arch of the bridge is to form an arc of a circle. Sam asked Bob if he would laminate the supporting arches for the bridge. Bob said that he thought that he could do that. He said I will make a form on my barn floor, soak the planks in the mill pond, and then bend them against the form.

When Bob began to construct his form, he came up against a problem that is now your problem:

What is the radius of a circle that satisfies Sam's specifications for his bridge? (The cord of the circle is 20 feet and the maximum distance from the cord to the circumference of the circle is 3 feet.)

[4]

**Writing Assignment:  
"Slope as Rate of Change"  
and "Slope as Rise over Run"**

Write three paragraphs. Write your first paragraph on interpreting slope as "rate of change." Give at least three examples (e.g., the slope of the graph of the decrease in the cost of Nike sneakers is the change in cost divided by time). In your second paragraph, discuss slope as "rise over run" and give at least three examples (e.g., the slope of a loading ramp is the height ('rise') of the truck bed divided by the horizontal distance ('run') of the ramp). Describe, in your third paragraph, that "rate of change" and "rise over run" are two interpretations of the same concept.

[5]

**Cutting Rafters**

A carpenter describes the slope or pitch of a roof by giving a number. A pitch of 10 means that the roof rises 10 inches for each horizontal foot as illustrated in the following diagram showing an end view of a roof construction.

In the Northern states that enjoy snowy winters, house roofs often have pitches of 8, 9, or 10. In areas with little snow, roof pitches of 5 or 6 are

fairly common. In building a pitched roof, a carpenter puts up a “ridge pole.” This is a plank that runs along the ridge of the roof. The width side of the plank is vertical to the base of the house. The roof rafters are usually 2x6 inch planks that rest on the top of the walls and extend to the ridge pole. The top end of each rafter is cut so the rafter fits smoothly against the ridge pole. The other end of the rafter is cut so that the cut is vertical to the base of the house.

Certainly the pitch of the roof affects the angle of the cuts on the rafters. Your task is three fold:

1. Explain your answer to the question: Are the angles for the two cuts on a rafter the same?
2. Determine the cut lines on a rafter for a roof with pitch 8 by computing the values of  $a, b, c, d$  in the roof rafter pictured below.
3. Formulate a function whose input is the roof pitch and whose output is the ratio of  $b/a$  that determines the cut on the ridge pole end of the rafter.

**[6] Just Say it isn't so!**

The letter “ $i$ ” denotes the square root of  $-1$ , an imaginary number. That is

$$i = \sqrt{-1}$$

The following uses the property that  $\sqrt{a}\sqrt{b} = \sqrt{ab}$ . Now consider

$$\begin{aligned} i(\sqrt{i} + \sqrt{-i}) &= i\sqrt{i} + i\sqrt{-i} \\ &= \sqrt{-i} + \sqrt{i} \\ &= \sqrt{i} + \sqrt{-i} \end{aligned}$$

Say it isn't so!

Hint: Rationalize the second factor on the left. That is, multiply and divide by the conjugate of the second factor on the left.

**[7]**

**Notices**

1. The National Mathematics Meetings will be held January 13-16 in San Antonio, TX. Plan to attend and bring along a colleague or two. Some sessions of interest are:
  - a. General Marshall (Huston-Tillotson College) will be a panelist on the College Algebra Reform panel on Thursday afternoon.
  - b. Sarah Bush (Wiley College) and Gene Taylor (Grambling State Univ.) will hold a Poster Session on College Algebra Reform on Saturday morning.
  - c. Students from Texas Southern Univ. and Prairie View A&M Univ. will speak Thursday evening in the session on “Explorations in Using the World Wide Web to Enhance the Teaching of Mathematics.”
2. The Deadline for contributions to our November Newsletter is

Friday, November 6, 1998

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 all welcomed. Please send material to Dr. Della Bell, Chair, Dept. of Mathematics, Texas Southern University, 3100 Cleburne St., Houston, TX 77004.

4. To subscribe to this Newsletter, send your name and address to Dr. Della Bell, Department of Mathematics, Texas Southern University, 3100 Cleburne St., Houston, TX. 77004

“A life is not important except in the impact it has on other lives.”

Jackie Robinson