

Vision - Potential

Vision Within Every Instructor – Potential Within Every Student

Newsletter of the HBCU College Algebra Reform Consortium*

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[1] **David Blackwell** **Univ. of California at Berkley (retired)**

Professor David Blackwell was NAM’s honored David Blackwell Lecturer at the MAA ’98 MATH-FEST held in Toronto, Canada. (Professor Blackwell presented the initial lecture, in 1994, in this lecture series named in his honor.) His topic was “Network Visualization.” The biographical description of Professor Blackwell that appeared in the NAM program is reproduced here.

David Blackwell currently lives in Berkley, California, where he is still active as a scholar, even though he retired a few years ago from the University of California at Berkley in the year (1954)

* Supported by the EXXON Education Foundation and the U.S. Military Academy. after having spent ten years at Howard University (Washington, DC), one year at Stanford, one year at Clark College (now Clark-Atlanta University), one year at Southern University, Baton Rouge, Louisiana, and one year at the Advanced Study Institute, Princeton, New Jersey.

Born April 19, 1919 in Centralia, Illinois, David Blackwell spent ten years there in public schools. In 1935, at the age of sixteen he entered the University of Illinois, Champaign-Urbana, where he received his A.B. degree in 1938, his M.A. in 1939, and his Ph.D. in 1941; all of his degrees are in mathematics. At the age of 22 he had earned a Ph.D. in mathematics and had been awarded a Rosenwald Fellowship to attend the Advanced Study Institute. This was the beginning of his more than fifty professional years as a world-class mathematician.

While at Howard University, David Blackwell distinguished himself as an excellent teacher, an able leader (department chair, 1947-1954) and a very productive scholar, publishing more than twenty papers during his tenure there. When he joined the faculty at Berkley, these characteristics became even more manifested. At Berkley, and worldwide, he was recognized as a distinguished scholar and gifted teacher. He chaired the Department of Statistics (1957-61) and he published an additional 50-

plus papers (a total of 80 publications prior to retirement).

His professional activities as a scholar brought him widespread recognition and acclaim. He has received twelve Honorary Doctorate of Science degrees from twelve institutions: Harvard, Yale, University of Illinois, Howard University, Carnegie-Mellon, University of Southern California, Michigan State, Syracuse, Southern Illinois, University of Warwick, National University of Losotho, and Amherst College. He has served as president of the Institute of Mathematical Statistics; International Association for Statistics in the Physical Sciences; Bernoulli Society; and vice president of the International Statistical Institute; American Statistical Association; and of the American Mathematical Society along with many other positions and honors. Two of the highest honors bestowed upon him have been his election to the National Academy of Science (first and only African-American Mathematician elected) and his election to the American Academy of Arts and Sciences. Additionally he holds membership in numerous professional organizations, including being a life member of NAM.

[2] Queries for Class Activities

These queries can be used in various ways. For example, a query could be used to engage students in doing mathematics while they are waiting for class to begin, or for a five minute small group challenge during class, or as an interesting exercise to think about while walking across campus.

1. A person's salary is reduced by 10 percent. By what percent would the person's reduced salary have to be raised to bring it back to the original amount?
2. (The following brain-teaser is taken from the July/August issue of Quantum.) Of 20 students in class, 14 have brown eyes, 15 have dark hair, 17 weigh more than 80 lbs., and 19 are more than 4 feet tall. Show that at

least four of the students have all four characteristics.

3. Show that for all real numbers a, b, c, d, x ,

$$\frac{(x-a)(x-b)}{(a-b)(a-c)} + \frac{(x-c)(x-a)}{(b-c)(b-a)} + \frac{(x-a)(x-b)}{(c-a)(c-b)} = 1.$$
4. (The following problem has been presented in many different guises. This presentation is taken from the July/August issue of Quantum.) "A retired general decided to sell his old boots. He sent his butler to the market with the pair of boots and instructions to sell them for \$15. The butler met two one-legged veterans at the market and sold each of them one boot for \$7.50. When the butler told his master about it, the general said that military veterans should be charged less. So, he gave the butler \$5 and told him to return it to the buyers. On his way to the market, the servant squandered \$3 on drink and returned \$1 to each of the veterans. Now let's count the money: each veteran paid \$6.50. Multiplying \$6.50 by 2, we get \$13. And \$3 dollars was squandered by the servant: \$13 + \$3 = \$16. Where does the extra dollar come from?"
5. The velocity of light in free space is 186,000 miles/sec. If the average (mean) distance from earth to the sun is 92,900,000, how many hours does it take for sunlight to reach the earth?
6. Suppose we buy quantities x_1 and x_2 , respectively, of two goods. The graph below shows the budget constraint $p_1x_1 + p_2x_2 = k$ where p_1 and p_2 are the prices of the goods and k is the available budget.
 - a. If the budget is doubled from k to $2k$, will the slope of the line showing the new

budget constraint be: doubled, stay the same, or be cut in half?

- b. If p_1 is doubled and everything else remains the same, will the slope of the new line describing the budget constraint be: doubled, be cut in half, or remain the same?

[3] Small Group Activity: Cost of Keeping Cool

Wet cloths hung over doorways was probably the earliest form of air conditioning. The first mechanical cooling device, a water powered fan, was developed by Leonardo da Vinci in the 1500s. Air-conditioning was first installed in cars (Packard Motors) in 1939 and in buses a year later. Today more than 70% of all homes have air-conditioning.

Our comfort comes, however, at a cost. In this small group activity, you are asked to determine the cost of running a room air-conditioner to cool your classroom.

Background information:

- a. The cooling power or capacity of an air-conditioner is measured in British Thermal Units (BTUs). One BTU is the amount of heat needed to raise the temperature of one pound of water from 59 to 60 degrees Fahrenheit. SEARS Kenmore BTU Cooling Estimator provides the following data relating room area (square feet) to BTU Rating.

<i>RoomArea(sq.ft.)</i>	<i>BTURating</i>
340	8,000
500	10,000
670	12,000
840	14,000
1,000	16,000
1,150	18,000

In addition to room size, the Cooling Estimator recommends that when more than two

people will be using the air-conditioned room, 600 BTUs be added per person.

- b. The efficiency of the air-conditioner unit also affects the cost. The Energy Efficiency Ratio (EER) of an air-conditioner is the ratio of the BTU Rating to the number of watts of electricity required to run the air-conditioner. For example, a unit that requires 600 watts to remove 5,000 BTUs per hour has an $EER = \frac{5,000}{600} = 8.33$. Room air conditioner units generally have an EER between 8 and 9.
- c. Electric companies charge by the kilowatt hour (KWH) in addition to a base monthly rate. Often companies have a tiered price schedule, charging a low rate for an initial amount of electricity and a higher rate for additional amounts. For example, Houston Lighting & Power Company charges \$0.02250 per KWH for the first 250 KWH and \$0.07652 per KWH for all additional KWH. In addition, there are fuel factor and surcharges of \$0.02062.

Your task is twofold:

- a. Plot the data on room area and BTU Rating (room area on horizontal axis). Determine the equation of a straight line that gives a good approximation of the data.
- b. Determine the cost of running a room air-conditioner to cool your classroom for a month. Assume that the air-conditioner runs for eight hours a day for each day that school is in session. Also assume the air-conditioner has an $EER = 8.5$. Finally, assume that the cost is \$0.09714 per KWH. Hint: Use the equation of the line obtained in part “a.” to determine the BTU Rating for your classroom.

[4]

**Writing Assignment:
“What Does ‘Mean’ Mean?”**

Write a one page paper on the concept of Mean or Average. Compare dictionary definitions of “mean” and “average” and comment on the definitions in your writing. Comment on why we use two words, mean and average, for this concept. Also discuss and give examples of arithmetic means and geometric means.

[5] **Average Value of a Barrel of Oil**

The June 1998 issue of **Fiscal Notes**, published by the Texas Comptroller’s Office, Austin, Texas contained the following data on the production of crude oil in Texas. The amounts are in millions.

<i>Date</i>	<i>Barrels</i>	<i>Value(\$)</i>
1993	574.6	9,316.6
1994	534.3	7,982.3
1995	505.3	8,163.6
1996	484.4	9,670.6
1997	464.9	8,516.8

- A. Compute the average value/barrel over the 5 year period.
- B. Compute the average value/barrel for each of the 5 years and then average these five averages.
- C. Are your answers in parts A and B the same? If not, explain why they are not.

[6] **Notices**

- 1. The 3rd Annual Retreat for the HBCU College Algebra Reform Project will be held October 1-3, 1998 at Wiley College in Marshall, TX. The program will begin with a pizza supper at 6:00 PM on Thursday evening and conclude with lunch on Saturday. The program will contain small group project work, discussion of classroom pedagogy and use of technology, development of small group projects,

and reports and discussions on the class testing of the new materials. Fellowship and food, of course, will be major events. All instructors of College Algebra courses are encouraged to attend.

- 2. 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.”
- 3. The Deadline for contributions to our October Newsletter is

Friday, October 2, 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