

Vision - Potential

Vision Within Every Instructor – Potential Within Every Student

Newsletter of the HBCU College Algebra Reform Consortium*

Number 39, February 2002

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Dept. of Physics, Prairie View A&M Univ.
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[1] A Grade Report on Contemporary College Algebra

A study comparing the grade distribution between the Contemporary College Algebra course and the traditional college algebra course shows a marked increase in the passing rate (grade C or higher) and major decreases in the withdrawal and incomplete rates. The study was conducted at five schools: Texas Southern University, Prairie View A&M

* Supported by the National Science Foundation and the U.S. Military Academy. University, Huston-Tillotson College, Grambling State University, and Clark Atlanta University. The time span for the study was four semesters: Fall 1999 - Spring 2001. In addition to the improvement in the grade distribution, anecdotal evidence strongly suggests that the Contemporary College Algebra course has been effective in creating a positive change in student attitudes.

<i>Section</i>	<i>Passing</i>	<i>Withdrawal</i>	<i>Inc.</i>
<i>Contemporary</i>	64.6%	5.3%	1.2%
<i>Traditional</i>	52.9%	13.0%	2.9%

[2] Pricing a House

When determining an *asking price* for a house, a realtor begins by first establishing a *comparison price*. This is done by computing the median of the sale prices of similar houses that have recently sold in the neighborhood. Suppose a realtor in Atlanta, GA selects five houses: A, B, C, D, E as her comparison set. Suppose their sale prices were: (A) \$175,000, (B) \$150,000, (C) \$200,000, (D) \$160,000, (E) \$190,000. Complete the following:

- a. Create a bar chart to display the sale prices of the houses in the comparison set.

- g. Based on Part f, approximate the volume/weight ratio for a 30 ounce box of cornflakes.
- h. Plot the (weight, unit price) data. What is the basic shape of the data?
- i. Fit a curve to the data plot in Part h.
- j. Based on Part i, approximate the price for a 30 ounce box of cornflakes.
- a. Explain the shape of your plot over the interval $[0,20]$.
- b. How long will it take a vehicle to stop when traveling 80 miles per hour?
- c. Approximate how far a vehicle traveling 70 miles per hour will travel during the stopping time. Explain your reasoning.

[5] Interpreting a Plot

Given the following graph of stopping distance in feet versus vehicle speed in miles per hour, determine a function model for stopping time in seconds in terms of speed in miles per hour. Then answer the listed questions.

Hint: Construct a *speed - distance* table from the given graph. Modify your table to express speed in terms of feet per second and then add a column labeled *time (sec)*. Fill in the time column using the

$$distance = (rate)(time)$$

relation. Then plot the $(distance(mph), time(sec))$ data and fit a curve to the data plot.

Questions:

[6] The World's Population

The United Nations Population Division reports the following numbers for the world's population from 1804, projected forward to 2054.

<i>Year</i>	<i>Pop.(billion)</i>
1804	1
1927	2
1960	3
1974	4
1987	5
1999	6
2013	7
2028	8
2054	9

- a. Plot the population data.
- b. Based on your plot in Part a, predict when the world's population will reach 10 billion. How confident are you in your prediction? List three reasons why you are confident in your prediction or three reasons why you are not confident in your prediction.
- c. Create a plot showing on the vertical axis the number of years it takes the population to increase by one billion and on the horizontal axis the population size in billions. Thus (123,2) and (33,3) are two of the data points.

- d. Based on your plot in Part c, predict when the world's population will reach 10 billion. How confident are you in your prediction? List three reasons why you are confident in your prediction or three reasons why you are not confident in your prediction.

**[7] Interview with Dr. David Wagoner
Dept. of Physics, Prairie View A&M Univ.**

(This is the part of an on-going sequence of interviews with faculty in partner disciplines discussing the role of college algebra in their disciplines. Dr. Laurette Foster conducted this interview.)

Dr. Foster: Is college algebra a required course for your majors?

Dr. Wagoner: College algebra is not listed as a requirement for our majors, however it is a prerequisite for calculus, which is required. We do have students that have not had the sufficient prerequisite for calculus and therefore must complete a college algebra course.

Dr. Foster: What skills learned in college algebra are critical to a student being successful in your courses?

Dr. Wagoner: Mathematics is used as a tool to understand the nature of physics. Students do not necessarily need a depth of theory in the mathematics, however they need to be able to develop an abstract model instead of one that is totally numerical. If a student is given a situation, they must be able to model that situation and interpret the results. It is critical that the students know how to solve simple equations composed of different variables and understand that it is one basic equation that gives different information. Our students need to understand the fundamental relationships and not memorize the different equations as independent equations. It is also important that a student can solve and interpret linear equations and simultaneous linear equations. Additionally the students

should be able to solve quadratic equations and interpret the results. It is important that they determine the number and types of solutions for these problems. Again it is important that the students can solve abstractly as well as numerically. If a student has these basic skills from algebra, they have the opportunity to be successful in calculus and, in turn, physics.

Dr. Foster: Thank you very much, Dr. Wagoner.

[8]

Notices

1. The fourth edition of *Contemporary College Algebra* by Don Small is now available (ISBN: 0-07-256439-3). Examination copies may be obtained by contacting the McGraw-Hill Publishing Co (1-800-338-3987).
2. The HBCU Consortium for College Algebra Reform will host a national conference on Reforming College Algebra. The conference will be held at the U.S. Military Academy, February 7-10, 2002.
3. Persons interested in hosting or attending a dissemination workshop for the Contemporary College Algebra program should contact Don Small, Dept. of Math. Sciences, U.S. Military Academy, West Point, NY 10996 [don-small@usma.edu]
4. The next issue of the *Vision - Potential* Newsletter will appear in March 2002. The

Deadline for contributions to the March Newsletter is Monday, March 4, 2002.

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.

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