

Vision - Potential

Vision Within Every Instructor - Potential Within Every Student

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[1] Who Takes College Algebra? How do they Do?

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In the 2003 fall semester, 818 students were registered for College Algebra at the Wolfson Campus of Miami Dade College. Out of those:

129, or **15.8%** had declared majors that required Calculus

Of these, 17 declared architecture, 35 declared computer engineering or computer science, 47 were biology, medical science, pharmacy or dentistry majors (the other majors requiring calculus—including engineering other than computer—were declared by

* Supported by the U.S. Military Academy.

very few of these students; there were no physics majors and only 3 math majors).

157, or **19.3%** had declared majors that required Business Calculus

Of these, 100 declared business administration and 26 declared accounting. Note: Business Calculus is, at Wolfson, an applications driven course in which technology is utilized extensively and has College Algebra as its only pre-requisite, unlike the “regular” Calculus course for which PreCalculus and Trigonometry are pre-requisites.

~~The rest (64.9% had majors that either did not require a math course of a level higher than College Algebra or were pre-BA (undeclared/unspecified), with the exception of 5 students whose major required PreCalculus (how odd to end one's mathematics preparation with a course having “pre” in its title).~~

So, if the purpose of College Algebra is seen as some sort of preparation for students who will ultimately take non-Business Calculus, then its purpose is to serve 15.8% of the students who take it.

A follow up study in the fall of 2004 accounted for 778 of these students. In this study “success” means receiving a grade of A, B, or C. The results were:

159 took Contemporary College Algebra (CCA)—Success rate: **71.1%**

619 took a traditional College Algebra course—Success rate: **54.8%**

Success rates in follow-on courses that had College Algebra as a pre- or co-requisite showed no significant difference between the

students who had taken CCA and those who took a traditional course. (Warning: The numbers of students involved in the following categories is very small.) The percentage figures are based on the number of students who were successful in their College Algebra course and who chose the particular track. The results are:

Toward the Calculus track

- 54.5% for the CCA students
- 54.5% for the traditional students

Toward the Business Calculus track

- 66.7% for CCA students
- 65.2% for the traditional students

Toward Statistics

- 59.1% for the CCA students
- 59.2% for the traditional students

Based on this small sample, it does not appear that taking CCA is detrimental to a student who goes on in any of these three tracks. However, because more students are successful in CCA than in the traditional course, the CCA opens the doors to more students to take additional mathematics than does the traditional program.

(Norma Agras is Chairperson of the Mathematics Department at Miami Dade College, Wolfson campus.)

(The MAA's CRAFTY committee welcomes reports on intended majors of college algebra students, grade comparisons between traditional and refocused courses, and student performance in follow-on courses. Send reports to Bill Haver, [wehaver@vcu.edu].)

[2] Advertising's Big Game

The Super Bowl provides advertisers with possibly the largest television audience of the year and one in which viewers usually watch the commercials rather than turning them off. One result of this, is the huge price tag for a

30-second commercial. *The New York Times*, February third edition contained the following data on the growth in the average cost of a 30-second commercial during the Super Bowl.

Year	Cost	Cost in '04 Dollars
1970	\$ 78,200	\$ 393,131
1975	110,000	411,663
1980	275,000	698,864
1985	500,000	887,873
1990	700,000	1,041,532
1995	1,000,000	1,244,939
2000	2,100,000	2,325,630
2005	2,400,000	2,400,000

Analyze this data. Here are a few questions to consider.

- From 1970 through 1995, the increases appear to be generally consistent. Determine a linear model (function) whose graph gives a good fit to the scatter plot. What does the slope of the line represent?
- Plot the data and then fit a curve to the scatter plot. Explain your choice of model (function). How much faith do you have in using your model for making predictions on the advertising costs in the future? Explain.
- The population graph of many species in a confined environment resembles the "S curve" of a logistic function. Is it reasonable to expect that the cost curve for advertising during the Super Bowl is also logistic? Explain.
- Use the scatter plot to determine a logistic model. What is the carrying capacity of the model? When will the cost of a 30-second commercial exceed four million dollars?

- What are some of the reasons that could explain the large jump in the cost from 1995 to 2000.
- Determine the inflation rate from 1970 to 2000 and from 1990 to 2000.
- A reported eighty six million viewers tuned into the Super Bowl. What was the cost per viewer of a 30-second commercial?
- How does the *per viewer* cost of a Super Bowl 30-second commercial compare with advertizing costs on other television programs?

[3] Puzzle: Shopping for Eggs

(This problem appeared in *Parade* magazine, November 7, 2004.)

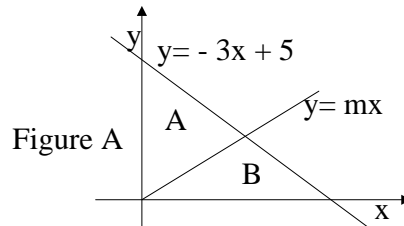
A woman shops for eggs. She tells the grocer, “Give me half the eggs in the basket plus half an egg.” He obliges. She returns the next day and tells the grocer, “Give me half the eggs in the basket plus half an egg.” He obliges her again. Similarly she returns the following day and tells the grocer, “Give me half the eggs in the basket plus half an egg.” Again, he obliges. She pays for the eggs and departs, leaving an empty basket behind. If she was the only person buying eggs, how many eggs were originally in the basket? Hint. Model the situation with a recursive sequence. Let $e(n)$ = number of eggs in the basket on day n .

[4] Fun Exercises

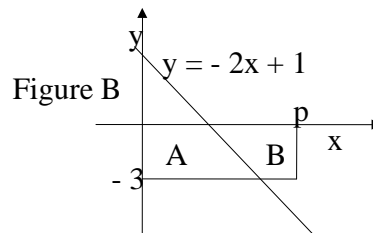
These exercises would be suitable for an in-class, small group activity or for test questions. They illustrate the What-ifing process—having worked an exercise, make up and work other variations of the same problem.

The problem in each of the following is to determine a line or point that will divide a region into two subregions of equal areas.

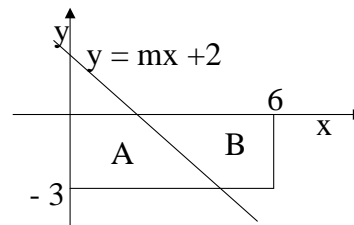
- a. Determine the slope, m , of the line in Figure A such that region A has the same area as region B.



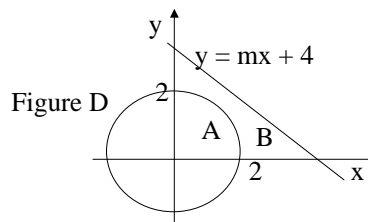
- b. Determine the point p in Figure B such that region A has the same area as region B.



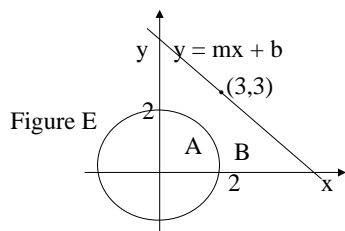
- c. Determine the slope, m , of the line in Figure C such that region A has the same area as region B.



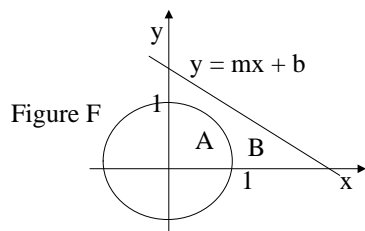
- d. Determine the slope, m , of the line in Figure D such that region A has the same area as region B.



- e. Determine the equation of the line passing through $(3,3)$ such that region A has the same area as region B. Is there only one such line? Explain.



f. Determine the equation of the line in Figure F such that region A has the same area as region B. Is there only one such line? Explain.



Sign in an old wood workers shop:

Thought for the Day

Whether you say
You can do it or *You Can't*,

your work will prove your
 statement correct.

[5] Notices

1. Past issues of the *Vision - Potential* Newsletter are available on our website: www/ContemporaryCollegeAlgebra.org.
2. Deadline for contributions to the April Newsletter is April 1, 2005. Opinion articles, suggestions for writing assignments, small group in-class activities, small group out-of-class projects, Queries, announcements, etc. are welcomed.
3. To subscribe to this Newsletter, write to Don Small, Department of Mathematics, U.S. Military Academy, West Point, NY 10996 or contact him via e-mail at don-small@usma.edu.