

Sinclair Mathnet

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FROM THE CHAIR



[This article is written with all due respect and apologies to John Sparks, who really can write a poem.]

Well, when Gary Mitchner, English Department Chair, read his poem at Dr. Wells' farewell reception, it went right over my head. At first I thought that was just because he was standing on top of a table when he read it. But those poems that come out of the English Department always go over my head. I just don't understand them. So I wrote a poem I could understand – a real poem, you know, one that rhymes. It's a poem written in language that is beautiful and eloquent, but understandable. It's what a poem should be, an expression of your deepest and truest emotions written to someone you really love or about something really important to you. This is a poem about my van. You may know her from the triangle lot. She's the big silver one with the rust colored roof. I bought her new back in '78 and we have been together ever since. She's getting older now (she had turned over 137,291 miles back in '93 when her odometer broke) and she doesn't always measure up to the high performance standards of her glory years, but the beauty of our relationship has not been tarnished (like her finish has). She will always hold a special place in my heart and I hope the English Department will learn something from this poem. Please stand, face the triangle lot, place your hand over your heart and read this poem aloud from wherever you are.



Buckitaboltz

Buckitaboltz! Buckitaboltz!
You ain't nuthin' but a buckitaboltz.
You got no sheen an you got no shine,
Yer a buckitaboltz, butchyer mine all mine!

Ya usually start an ya usually stop.
Ya usually leak thru the holes on top.
Yer windows sometimes work just fine.
Yer a buckitaboltz, an yer mine all mine.

Ya once wer young an ya once wer new.
Ya usta go over 50 too!
Ya once could go in a perty straight line,
Yer a buckitaboltz, an yer mine all mine!

Ya don't complain, an ya never pout.
Ya usually go the intended route.
Ya never gripe, an ya never whine.
Yer a buckitaboltz, an yer mine all mine!

Yer ceiling sinks, hits me in the head.
Yer outside looks like a rusty shed.
Ya just won't go uppa steep incline.
Yer a buckitaboltz, butchyr mine all mine!

Some parts don't work and that's no joke,
But there ain't nuthin' on you broke
That can't be fixed with tape and twine.
Yer a buckitaboltz, an yer mine all mine!

Folks wanna know if yer ded and gone.
But a buckitaboltz keepsa travelin' on.
Yer a shinin' star in the gran dezine,
Yer a buckitaboltz, an yer mine all mine!

By the way, forgive me for wandering from my typical themes this time. I thought you might like to hear about something else for a change. But in case you were wondering, everything is just fine in the Math Department.

Al Giambrone ■



Department Activities



(Above) Susan Harris presents Steve Rowland with the first-place award for the Fall Quarter AMATYC Student Math Competition.

(Above Right) Harvey Chew spoke at the Winter Quarter Department Colloquium on “The Personality of Numbers.”

(Below) Tom Wilson also presented at the Colloquium on “Education in China.”



REMINDERS

- All tests should be approximately one hour in length.
- If you have a Math 101 student who receives a calculator accommodation from Disability Services, you should obtain copies of the exams provided by the department for them. Contact the Office.
- Please remember to give your students a syllabus on the first day of the term that includes all of the elements identified on pages 1.3 and 1.4 of our department handbook. Also make sure the department gets a copy of it. If you need a handbook, contact the Office.
- Please do not skip material or modify the number of tests given without consulting with your course coordinator.
- Remember to give a diagnostic test to all of your Math 101, 102, 116, and 131 students on the first day of class and advise them accordingly.





Lessons From the Internet

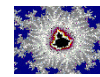
with us at the workshop are listed below. They provide excellent resources for our classes. The archives.math.utk.edu site links to many other sites.

In January, Barb Carruth offered the workshop "Lessons From the Internet." Some of the websites she shared

RELATED COURSE	TOPIC	COMMENTS
MAT 101	Plotting points on the rectangular coordinate system	<p>http://cbsnews.com/campaign2000results/county/county_flop-0.html</p> <p>Use November 2000 presidential election data from Florida counties to plot ordered pairs on a coordinate system. Have students (hand) plot either votes for Gore or total votes cast in all the counties on the x-axis, and votes for Buchanan on the vertical axis. Students may need help in setting the scales on the axes because of the size of the numbers. For more on this issue, visit http://madison.hss.cmu.edu/ where there are "thumbnail" sketches of the graphs showing the Palm Beach County outlier, and links to other sites related to the election.</p>
MAT 101, 131	Order of operations; Solving formulas	<p>http://www.ti.com/calc/docs/act/hopfen01.htm</p> <p>This site gives the formula used by the NFL to rate quarterbacks, and 1997 data with a link to the NFL website where more current data can be accessed. Although the site presents the lesson to use lists in a graphing calculator, the formula and data could be used with a four-function and scientific calculator for the computations. The students will need to know how to substitute in for the variables and obey the order of operations.</p>
MAT 105, 106, 108, 110, 122	Creating and Interpreting Graphs	<p>http://it.stlawu.edu/~rlock/maa51/data.html http://www.weather.com/weather/us/zips/45402.html</p> <p>These are sites with data or links to data that students can use to construct and interpret bar graphs, line graphs, or pie charts. Graphs could be hand drawn or done in Excel. Thanks to Gwen English for sharing her ideas and Excel directions for using weather data for graphing in her MAT 106 class.</p>
MAT 116, 132	Exponential Functions	<p>http://archives.math.utk.edu/visual.calculus/0/parameters.5/index.html</p> <p>This site has an animation that will graph the family of exponential functions $f(x) = a^x$ (with parameter a) for various values of a between 0.2 and 6. (Note the speed of the animation may be a problem. Classes using graphing calculators could do the same lesson at their own speed.)</p>



RELATED COURSE	TOPIC	COMMENTS
ALL COURSES	All topics	http://archives.math.utk.edu/topics/ This is a general math website to find more lessons.
MAT 116	Composition of Functions	http://archives.math.utk.edu/visual.calculus/0/compositions.6/index.html This site has a Java applet illustrating the geometrical construction of the composition of two functions.
MAT 116, 132	Polynomials	http://archives.math.utk.edu/visual.calculus/0/polynomial.1/my2.html See a LiveMath Notebook to compare polynomials of different degrees.
MAT 116	Translations, stretching, and reflections of functions	http://archives.math.utk.edu/visual.calculus/0/shifting.4/index.html This site has a Java applet to explore graphically the effect of transforming a graph with translations, vertical and horizontal stretching and reflections.
MAT 116, 132	Non-linear functions	http://www.ti.com/calc/docs/ “Do Birds Use Calculus?” is the name of this activity lesson where the students conduct an experiment to create a non-linear function. Although it suggests using a graphing calculator, it can be adapted to be done “by hand” on graph paper.
MAT 116, 133, 201	Conic Sections Eccentricity of an ellipse	http://archives.math.utk.edu/visual.calculus/0/polar.4/derive.html This site gives directions for using Derive to review the concept of eccentricity through examining the effects of changing the value of the variable e in the polar equation of an ellipse.
MAT 201, 133	Limits	http://archives.math.utk.edu/visual.calculus//1/limits.4/index.html This site has a JavaScript exploration in getting numerical evidence for determining a limit
Any course with calculus topics	Derivatives	http://archives.math.utk.edu/visual.calculus/2/index.html This is the Math Archives site for lessons on derivatives.



AMATYC Student Math Competition

Amy Thompson, pictured at the left, received the first-place award for the Winter Quarter AMATYC Student Math Competition. She also received a \$50 prize. Tied for second-place were Elise Davis and Dan Steck, who split the \$25 second-place prize.

Please advise students that the Spring Quarter test is scheduled for Saturday, April 14. Flyers will also be distributed at the start of the quarter.

The following is a sample of some of the types of questions that students encounter in the AMATYC Student Math Competition. These were taken from Winter Quarter's Test. The tests are given each

quarter except Summer Quarter. After the third test in the spring, student scores are tallied to obtain a cumulative score. The tests generally consist of twenty multiple-choice questions that cover precalculus topics. Students have one hour to answer as many of the twenty questions correctly as possible.

- 1) Let S be the set of all points in the plane that are twice as far from the point $(3, -1)$ as from the point $(4, 2)$. The points of S lie on what curve?
 - A. A straight line
 - B. A circle
 - C. A parabola
 - D. A hyperbola
 - E. An ellipse that is not a circle
- 2) Let AMA and TYC be three-digit numbers (a leading digit cannot be zero) such that each different letter represents a different decimal digit 0 to 9. If $AMA - TYC$ is 22, what is the value of $T - C$?
 - A. -1
 - B. 0
 - C. 1
 - D. 2
 - E. It depends on the choices of A and M .
- 3) Define a sequence a_n by $a_1 = 1$ and for $n \geq 1$, $a_{2n} = 2a_{2n-1}$, $a_{2n+1} = a_{2n} + 1$. Which of the following is closest to $\sqrt[2001]{a_{2001}}$?
 - A. 1
 - B. $\sqrt{2}$
 - C. 2
 - D. $2\sqrt{2}$
 - E. 3
- 4) A collection of seven positive integers has median 3 and unique mode 4. If the collection is increased to nine values by adding two 2s to it, the median and unique mode both are 2. What is the mean of the new collection?
 - A. $23/9$
 - B. $8/3$
 - C. $25/9$
 - D. $26/9$
 - E. 3
- 5) How many pairs (r, s) of positive integers satisfy the equation $r^2 - s^2 = 2001$?
 - A. 0
 - B. 1
 - C. 2
 - D. 3
 - E. 4

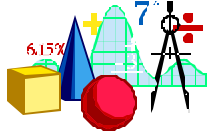
(Answers are on page 6.)



Test Your Skills

We hope you have time to try these problems and to offer your solutions to either Lyn Keeler or David Stott.

Try your hand at the Tartaglia-Cardano method for solving a cubic equation. The steps for the method are outlined in the problems below.



1 Show that the general cubic equation $y^3 + By^2 + Cy + D = 0$ can be written in the form $x^3 + ax + b = 0$ by using the substitution $y = x - \frac{B}{3}$.

2 In the equation $x^3 + ax + b = 0$, replace x by $H + K$. Let $3HK = -a$, and show that $H^3 + K^3 = -b$.
(Hint: $3H^2K + 3HK^2 = 3HKx$.)

3 We now have two equations:
 $3HK = -a$ and $H^3 + K^3 = -b$.
Solve the first for K , and substitute into $H^3 + K^3 = -b$. Then show that

$$H = \sqrt[3]{\frac{-b}{2} + \sqrt{\frac{b^2}{4} + \frac{a^3}{27}}}$$

4 Substitute this value back into $H^3 + K^3 = -b$ to show that $K = \sqrt[3]{\frac{-b}{2} - \sqrt{\frac{b^2}{4} + \frac{a^3}{27}}}$.

5 Use the results obtained above to show that the solution of $x^3 + ax + b = 0$ is

$$x = \sqrt[3]{\frac{-b}{2} + \sqrt{\frac{b^2}{4} + \frac{a^3}{27}}} + \sqrt[3]{\frac{-b}{2} - \sqrt{\frac{b^2}{4} + \frac{a^3}{27}}}$$

6 Use the formula from problem 5 to solve the cubic equation $x^3 - 6x - 9 = 0$.

AMATYC Test Solutions

From page five, the solutions to the problems are:

1) B 2) C 3) B 4) B 5) E

Just Thinking

- Why isn't phonetic spelled the way it sounds?
- If the 7 - 11 is open 24 hours a day, 365 days a year, why does it have locks on the door?
- If a firefighter fights fire and a crime fighter fights crime, what does a freedom fighter fight?
- If a cow laughs, does milk come out her nose?
- If you are driving at the speed of light and you turn on your headlights, what happens?



Harvey's Joke Corner

An unhappy investor saw her liquor stock halved and wanted a double.

Q. What newsletter has mathematical openings?
A. *The Mathnet*.

Q. What is the best looking figure in geometry?
A. Acute angle.

Possible title for a Police Science math refresher course: "Fuzzy Math."

A very early "dot.com" in mathematics: $\mathbf{a} \mathbf{b} = \mathbf{b} \mathbf{a}$ (The dot product is commutative.)

When my wife Martha corrects all my checkbook errors, she uses "Marthamatics."

Students who love Algebra experience "The Joy of X."

