

Sinclair Mathnet

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FROM THE CHAIR



From the Department Office point of view the focus for the past several months has centered on the logistics of offering classes, professional development and assessment. Handling our largest enrollment ever has kept us very busy

hiring new faculty, getting classes staffed, and solving room problems. Planning for several professional development activities such as the Departmental Retreat, Fall Conference, College Wide Learning Day, and the Departmental Colloquium have also kept us busy. And assessment too has been a focus with Faculty Performance Reviews and preparations for our department review. But as the Fall Quarter draws to a close and we begin looking toward the winter, the major item that looms on the horizon is budget.

As I think about the primary budgetary needs of the department, two things come to mind. The first is the number of full-time faculty. The North Central Accrediting Association recommends a ratio of 60% full-time faculty to 40% part-time faculty. Of late there has been much discussion within the college about the importance of achieving this ratio within every division and every major department. But there is also much debate about how that ratio should be measured. Should only tenure track faculty members be counted toward the 60% or should special adjuncts and annually contracted faculty members be included? Should the measurement be based on number of sections taught, on FTEs taught, or just on the number of instructors in each category? Should overload taught by full-timers be counted in the part-time column since it is paid at the part time rate? But, no matter how it is measured, it would be difficult to concoct a way of measuring that wouldn't leave the Mathematics Department still woefully lacking in an appropriate number of full-time faculty members.

For example, measuring by sections taught during this Fall Quarter and including special adjuncts and annually contracted faculty as full-timers, only 63 out of 135 sections were taught by full-timers - a scant 46.7%. This is quite a long way from 60%. In a report to the Provost and the Vice President for Instruction, Dean Jones recommended, based on FTE's for the current quarter and the division's average class size goal, that our department's total of 20 full-time faculty members would have to be increased to 27.5 to satisfy the 60:40 targeted ratio. (I don't know who we would get for the .5 but I'm sure that anyone with half a brain could fill the position.) It is probably not reasonable for the department to expect to remedy this deficiency immediately, but making substantial progress will likely be one of our goals in this next budgetary process.

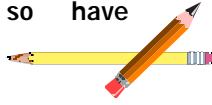
The second budgetary issue that comes to mind involves the Math Help Room where student usage is rapidly outgrowing the confines of the present facility. In 99/00 the Help Room got off to a great start drawing 4966 student visits. In 00/01 usage rose to 5586 visits. By 01/02 the Math Help Room was the third most visited resource lab in the LAS Division (after the Math Lab and the English Writing Center) with 5883 visits. So far this year the visits are on a pace to reach 2550 in Fall Quarter alone! This will be a 65% increase over last Fall Quarter! A visit to the Help Room during any morning, early afternoon or even in the evening will quickly demonstrate the inadequacy of the available space. Students have complained on questionnaires and to instructors that they have had to leave the Help Room because it was too crowded. But adequate space is a major problem for the college and expansion space for the Help Room will not be easy to come by. There has been considerable talk about consolidating resource labs in the Learning Resource Center. This would free up space throughout the campus for classrooms and offices and utilize space in the LRC that is not frequented as much by students now as it was 15 - 20 years

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Faculty Feature

Last spring, during the colloquium at which she won the Part-time Faculty Member of the Year award, Marilyn Thompson shared with us some of her thoughts on teaching. We felt her insights deserved a wider audience, and so have reproduced them here.



I have learned many things in my 17 years of 2 nights/week teaching at Sinclair following a full day teaching in the public schools. Here are a few thoughts.



Wear a pair of round-toed, flat, comfy shoes. It's 2 hours on your feet after a full day of work and long walks to and from those parking lots.

Develop a sense of humor. You'll need it for the tough times - like when there are scheduling goofs at Centerville High School, and you find hundreds of screaming cheerleaders in the commons area outside your classroom that has no door (but a door wouldn't help much!). But you'll have fewer tough times if your students laugh WITH you and not AT you. I purposefully incorporate humor into my classroom presentation as well as spontaneously letting it happen.

Compliment the custodians and other folks. You'll need a new light bulb in your overhead projector or a room change on the nights of those scheduling goofs. The folks will also find lost calculators for you and assist with ill students.

I try to remember what it's like to learn something that was VERY difficult for me, and then I try to realize that some of the students in my room may be feeling that way. Perhaps I need to discreetly offer help or a time to talk outside class time.



Use crystal clear, high quality copies for tests and handouts. Folks today have high expectations about this. Education is slowly catching up with the business world in this area.

A real live teacher should be better than any textbook. I strive each evening to implement the use of one of Harold Gardner's non-mathematical intelligences (since the mathematical one is the one used extensively).

A quality I have always admired in certain teachers is approachability. One way I work for that quality in myself is to encourage them to call me at home and ask a question about the homework anytime up until 10 PM. (I average only 1 call per quarter!) As they walk out I remind them, "Don't forget to call me if you need help."

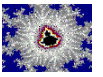
I tease them when no one has called, and the first person to call me receives a congratulatory handshake in class. I also encourage approachability by learning their names during the first class, and by calling them by name throughout the rest of the quarter. (I warn them that I call on non-volunteers as well as volunteers). By the 2nd week I try to know something else about their lives - like where they work or what sports they are following in the Olympics. These mini conversations usually happen before class as I am setting up or after class as I am packing up. I then use this information to create mathematical simulations - so they become part of the practical application.

As I constantly examine my role as a teacher, I throw out ideas that did not go so well - replacing them constantly - trying to get that better and better mousetrap. My mind is pulled back in time to the great teachers of my life - not only to those who taught me my favorite subjects (although they count too!), but also to those who taught me when I was a reluctant learner. I hope that in my teaching experiences I have replicated some of "what works".

Thanks for your attention. It's been a great profession.



Marilyn Thompson ■



Johannes Kepler is best remembered for discovering the three laws of planetary motion that bear his name.

Johannes Kepler

Johannes Kepler was born on December 27, 1571, in the small town of Weil der Stadt in what is now Germany. He was the firstborn child of a mercenary soldier and the daughter of an innkeeper. His father left home for the last time when Johannes was five, and is believed to have died in the war in the Netherlands. Johannes and his mother went to live at his grandfather's inn.

The family was poor, but Kepler's intelligence earned him a scholarship to the University

of Tübingen, where he studied with the intention of becoming an ordained Lutheran minister. He was a profoundly religious man, and saw his life's work as a fulfillment of his Christian duty to understand the works of God. Kepler was convinced that God had made the Universe according to a mathematical plan. It became clear, however, that his religious beliefs were not in agreement with those of the Lutheran church, and he eventually abandoned his plans for ordination and instead took a position teaching mathematics in Graz.

Just before the turn of the century Kepler moved to Prague where he worked with the famous Danish astronomer, Tycho Brahe. Kepler inherited Brahe's post as Imperial Mathematician when Brahe died in 1601, and was able to obtain possession of the massive amount of astronomical data that Brahe had collected despite the attempts by Brahe's family to keep the data from him in the hope of monetary gain. Using this data, Kepler discovered that the orbit of Mars was an ellipse with the Sun at one focus.

LOGGING IN

Constructing tables of astronomical data, the normal business for an astronomer, always involved tedious and difficult arithmetic calculations. Kepler was therefore delighted when in 1616 he came across Napier's work on logarithms (published in 1614). His former astronomy professor told him, however, that it was unseemly for a serious mathematician to rejoice over a mere aid to computation, and that it was unwise to use logarithms because no one really understood them. Kepler's answer to the second objection was to publish a proof that explained how logarithms worked.





In 1609 he published *Astronomia Nova*, the work containing Kepler's first two laws of planetary motion:

- I. The orbits of the planets are ellipses with the Sun at one focus of the ellipse.
- II. The line joining the planet to the Sun sweeps out equal areas in equal times as the planet travels around the ellipse.

What is also very important about the book is that it defines what has become known as the scientific method.

The Harmony of the World (*Harmonices mundi*), published in 1619, contained Kepler's Third Law:

- III. For any two planets, the ratio of the squares of their periods will be the same as the ratio of the cubes of the mean radii of their orbits.

While Kepler was working on *The Harmony of the World*, his mother, Katharina Kepler, was accused of witchcraft and brought to trial. She was eventually released, at least in part as a result of technical objections arising from the authorities' failure to follow the correct legal procedures in the use of torture.

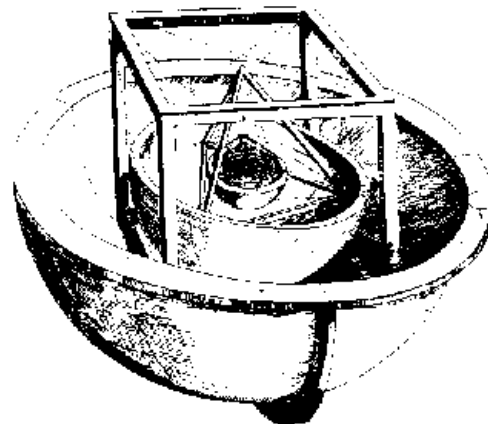
Kepler died November 15, 1630, in Regensburg, after a short illness. He was buried in the local church, but this was destroyed in the course of the Thirty Years' War and nothing remains of the tomb.

KEPLER'S VISION

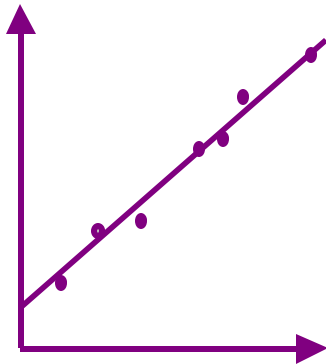
The astronomy that was taught to the majority of pupils at the University of Tübingen was geocentric astronomy - the version of the Ptolemaic system in which the seven known "planets" (Moon, Mercury, Venus, Sun, Mars, Jupiter and Saturn) moved around the Earth. One professor, however, also taught the new heliocentric cosmological system of Copernicus to a select few of his best students, Kepler being one. Instead of seven planets, the Copernican system had only six, (the Moon becoming a body that Kepler called a 'satellite') and in this system the planets orbited the Sun.

In his *Mystery of the Cosmos* (*Mysterium cosmographicum*) published in 1596, Kepler revealed his vision of the universe. He believed that the five convex regular solids gave rise to the orbits of the six planets of the Copernican system. It was a mathematically beautiful theory and was actually supported by the available observational evidence.

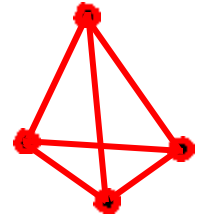
If a sphere is drawn to touch the inside of the path of Saturn, and a cube is inscribed in the sphere, then the sphere inscribed in that cube would be the sphere circumscribing the path of Jupiter. If a regular tetrahedron were drawn in the sphere inscribing the path of Jupiter, the inner sphere of the tetrahedron would be the sphere circumscribing the path of Mars. Continuing inwards, the regular dodecahedron would lie between Mars and Earth, the regular icosahedron between Earth and Venus, and the regular octahedron between Venus and Mercury.



MAT 151 – Introduction to Mathematical Modeling



MAT 151 – Introduction to Mathematical Modeling will be offered Winter Quarter. It will be taught by Susan Myers, who designed the course, and it will meet on Mondays and Wednesdays from 1:00 – 2:15.



The course was developed from a topics course of the same name that was conducted several times in the past for honors credit only. It was then revised and expanded to three credit hours, and has since been flexible enough to allow students to register for honors credit or regular credit.

The emphasis of the course is on solving real-world problems by using mathematics. Topics include data analysis, applications of functions, matrix models, and graph models. The student will learn to communicate mathematical ideas orally and in writing, and will gain an appreciation of the power of mathematics.

$$\begin{bmatrix} 2 & 2 & 8 \\ 5 & 9 & 7 \\ 3 & 9 & 1 \end{bmatrix}$$

The course has occasionally been offered the last few years, but has sometimes been cancelled due to low enrollment. Please share information about the course with your students, and tell them that this course helps to answer the question, "How is mathematics actually used?"

Retreat Puzzles

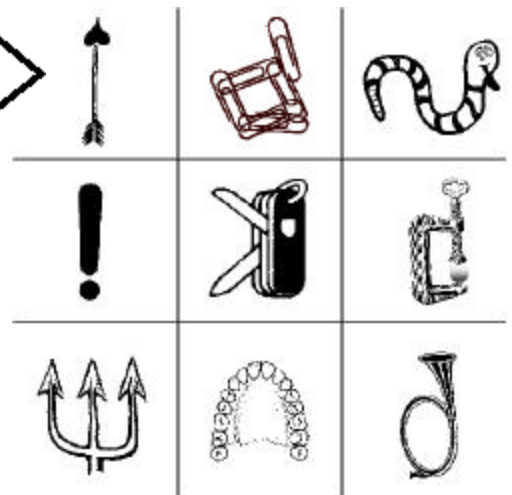
Participants at this year's retreat worked in teams to brainstorm a variety of puzzles. Here are a few extras for you to try on your own.

1.

1	ABC 2	DEF 3
GHI 4	JKL 5	MNO 6
PRS 7	TUV 8	WXY 9
*	0	#

628-4638

2. What is a mathematician's favorite dessert?

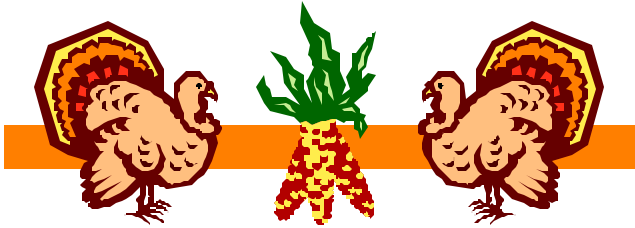


3. If BOOKCASE = "chef + foundation," then what does "ready to be picked and eaten" + "not as loose" equal?



ago. But situating the Math Help Room and/or Math Lab so far away from math classrooms could drastically reduce the likelihood that students would take advantage of them. And having them so far away from faculty offices would dramatically hamper faculty members' ability to support them. We will need to address these problems aggressively and creatively.

Al Giambrone ■



Reminders

- *Help us in providing instructors with desk copies by returning texts that you will not be using next quarter so that we can have them available for instructors that need them.*
- *Remember that as outlined in our department handbook, work done at home should not account for more than 30% of a student's grade, and multiple choice tests including the department final should not account for more than 40% of a student's grade.*
- *Students expect classroom instruction to supplement what they find in their textbook, and rightly so. Good instruction consists of more than just repeating examples that appear in the text and answering students' questions on homework exercises.*
- *Please do not skip material on the syllabus or modify the number of tests given without consulting with your course coordinator*

Images from the Retreat

