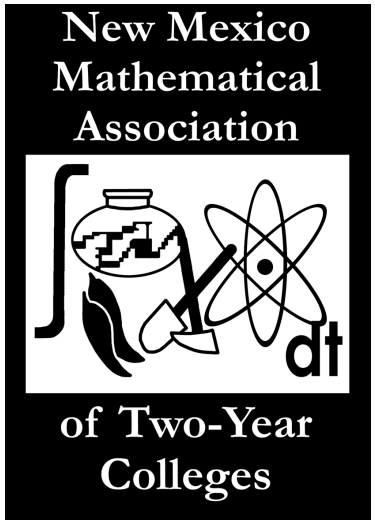
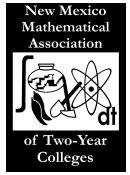


NMMATYC News



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Volume 24 **Issue 2**

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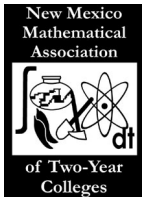
New Mexico Mathematical Association of Two-Year Colleges

New Mexico Mathematical Association of Two-Year Colleges

NMMATYC News

Volume 24

Issue 2



Inside this issue:

President's Message

Ali Ahmad

Dear NMMATYC colleagues,

Thanks to all of you who attended the spring annual joint conference with MAA in Roswell May, 2011. As many of you know, we honored several faculty and students : The David Lovelock Teaching Excellence Award went to Lucy Gurrola from Dona Ana Community College, the Professional Development Award went to Fariba Ansari from El Paso Community College, the Michelle Jimenez Scholarship went to Olga Saprycheva from El Paso Community College, the Vicki Froehlich scholarship went to Casey Strzelesicz from Central New Mexico Community College, and the Celeste Nossiter Book Scholarship went to Hyung Kyung Yi from El Paso Community College.

Professional development is a key to bring new innovative ideas to your classroom and updating your knowledge especially with rapid technology changes. I have learned that going to conferences like NMMATYC and AMATYC has helped me to sharpen my teaching skills and make me more focused with teaching and learning strategies. Please make your calendar to attend the annual NMMATYC 2012 conference in May 2012 in Las Cruces. We are planning to make it enjoyable conference.

The AMATYC conference will be held on Nov 11-14 in Austin, Texas. The conference has a wide variety of interesting topics to choose from. I hope to see some you all there.

Best wishes,

Ali Ahmad

Beyond Infinity
By Melinda Camarillo

This year's theme for the NMMATYC conference was *Mathematics – Taking you to Infinity and Beyond*. Although infinity comes up in many mathematical situations, the idea of infinity can be hard for some students to grasp. Students in Algebra up through Calculus tend to ask more questions in class when infinity comes up.

For example, when writing $\{x \mid x \geq 5\}$

in interval notation $[5, \infty)$

students often question why infinity is written with a parenthesis after it instead of a bracket. At these times, I feel it is important to explain to the class in more detail the concept of infinity. Some students have a few misconceptions about infinity, so it is good to address these in class. One way that I have been addressing infinity in class is by explaining the philosophical aspects of it. I have learned more about that through my collaborations with one of my colleagues, philosophy instructor Gabriel Camacho. Mr. Camacho was interested in learning about the applications of infinity in the mathematical context so that he could bring some of those ideas into his philosophy classes, and I was interested in broadening my understanding of infinity to help me better explain the concept in my math classes. By collaborating on this topic, we each gained new knowledge of infinity from the perspective of another field. We also discovered ways to bring in ideas from the other's discipline to help our students understand this fascinating concept. We presented some of our ideas for addressing infinity in the mathematics class at this year's NMMATYC conference in Roswell.

This semester, I have already been applying some of our ideas into my classes when infinity comes up. I have noticed that talking about infinity philosophically really opens up my students eyes and they appreciate this broader definition that I provide. I even had one student who was so intrigued by this concept that he was going to sign up for a philosophy class soon!

Infinity is not the only concept that can be explained by bringing in ideas from another discipline. There are so many other topics that can be viewed, not only from a philosophical perspective, but also from the perspective of any other subject. I would encourage collaboration with other colleagues outside of your discipline to expand your knowledge of mathematics and thus, enhance your teaching. But most importantly, take students' learning *to Infinity and Beyond*!

Melinda Camacho
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Using S-STEM/POWER Programs to Impact our Community and State
By Fariba Ansari

After receiving a grant from the National Science Foundation, S-STEM Faculty at EPCC began working together with the POWER Program to learn how to use their math and science skills to benefit the community, to mentor students and guide them into community-minded citizens who will impact their world. What we do today will shape our tomorrow. Instructors and students will work together for the benefit of the community. Teachers and students will increase valuable leadership skills, expand their critical thinking and gain excellent networking resources for the future. Join us to learn how to become part of these programs.

Our team of faculty: Edith Aguirre, Dr. Naomi Waissman, and myself will be giving students a project to learn how to use their math and science skills in the workforce. The presentation will outline a POWER project that was done by students in a Fall statistics course along with 8 S-STEM students. Students will analyze data provided by the International Boundary and Water Commission and look at nutrients along separate segments along the Rio Grande Basin. Our goal is to be able to set standards on the water for Texas, since there are none for the river. The results of the student projects will be presented and provide information on how to get involved in the POWER program, as a STEM (Science Technology Engineering and Mathematics) faculty.

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NMMATYC AWARDS

- The David Lovelock Teaching Excellence Award honors an educator who has made outstanding contributions to mathematics education at the two-year college level. The recipient receives a one-year AMATYC membership and a plaque. Nominate a deserving colleague or self-nominate.
- The Professional Development Award of up to $300 provides financial support to a NMMATYC member to participate in a professional development activity.
- The Vicki Froehlich Memorial Scholarship is awarded to a declared education major with emphasis in mathematics. The $500 award is for the 2011-2012 academic year.
The Michelle Jimenez Memorial Scholarship is awarded to a student whose declared major requires several mathematics courses at the two-year college level. The $500 award is for the 2011-2012 academic year.

The deadline for nominations for all awards is April 6, 2012. Inquiries and nominations may be directed to Mary Caffey, NMMATYC Nominations Chair, at mary.caffey@clovis.edu.

Critical Mathematics and Ethnomathematics in the Context of Teaching
by German A. Moreno

My presentation at this year's NMMATYC was about the notions of critical mathematics and ethnomathematics. These ideas present a challenge to our "traditional" ways of constructing curriculum and of enacting it pedagogically on our students. I thank the attendees for their thoughtful interactions on these ideas.

Critical mathematics theory asserts that mathematics is not value free even if we believe that mathematics is only about pure abstractions (Skosmose, 1995). Theorists such as Ole Skovsmose believe that these "pure abstractions" end up being actualized in the technologies we use as a society, whether it be things like computers and cell phones or things like the ways cities, subways, and supermarkets are constructed. Mathematics is used as the tool to make "movement" through our world more efficient (2001). He believes this is dangerous because technologies forget that humans are the "things" being moved, and therefore we become objects at the hands of reasoned world.

Ethnomathematics is the field that investigates the ways in which cultures do mathematics. The focus is often on non-Western cultures, but also has been used to understand the mathematics of nurses and surgeons. Theorists like Ubiratan D'Ambrosio believe that the dominance of Western thought and mathematics means that the ways of coming to know the world that arise from other viewpoints are devalued (1985). In particular he discusses the ways in which colonialism used mathematics as a way to oppress, something which is still felt in ours "preference" for certain ways of doing mathematics.

These two ideas are especially relevant to educators of people from marginalized communities. We often work with people who are most at risk of being used by techniques, and whose ways of thinking are often devalued. When we stress for example that Algebra is more important to know than peoples "everyday" techniques for solving problems, we are the conduit from which techniques and dominance come. Our textbooks are experts of presenting problems which nobody (not even mathematicians) would solve using abstract techniques. They claim that this is a bridge to knowing Algebra when we know historically none of these problems were the impetus for developing the abstract method.

The point is not to throw out Western mathematics – obviously there are many beautiful things that can be accomplished by this mathematics. We must however recognize that there are also horrors that we owe to Western thought, and that other ways of thinking need to be included. Our students solve problems in unique ways that arise out of their creativity. This is true even if we are unable to see this due to our habitual preference for the ways in which we were trained.

These thoughts may sound rather pessimistic, but for me they have come to challenge me as an educator. When I become inundated by institutional requirements (these were more explicit when I was a public school teacher), alternative ways of viewing the world push me toward a new pedagogical frontier. I believe that my students benefit from this. These are the ideas that challenge me and I hope that you will find those ideas that will challenge you.

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References

D'Ambrosio, U. (1985). Ethnomathematics and its place in the history and pedagogy of mathematics. For the Learning of Mathematics. V 5 n 1 p. 44-48

Skovsmose, O. (1994). Towards a critical mathematics education. Educational Studies in Mathematics, 27 (1), 35-57

Skovsmose, Ole. (2001). Mathematics in Action: A Challenge for Social Theorizing. Canadian Mathematics Study Group. Proceedings from the Annual Meeting

What is Golden about the Regular Pentagon?

By Rita Eisele, Ph.D.

I am always amazed by how much knowledge I acquired as a student, but without any clear memory of how I actually learned it. How did I learn how to construct a regular pentagon? It might have been one of those little tricks, like making "crow's feet" with string that I learned as a child. At any rate, I have used the regular pentagon construction many times in my teaching but without any real understanding of why it works. If a student asked for a reason, I would just respond that it was based on the golden ratio. This seemed to satisfy their curiosity, or at least they stopped asking!

I find that most students really enjoy doing constructions and this is a great way to introduce the concept of proof. The construction of the regular polygon is fairly easy to teach and it incorporates many properties from Euclidean geometry. So, I finally decided it was time to start doing some investigation into the connection between the golden ratio and the regular pentagon.

I found an excellent discussion about the golden ratio and a theorem about regular polygons in *Modern Geometries, 4th edition* by James R. Smart. The theorem states "The diagonals of a regular polygon divide each other in the golden ratio. (Smart, p. 170) The results of this theorem lead to another theorem that states that the ratio of a diagonal to a side is also the golden ratio. I used this as the basis of my informal proof. Because of my investigations, I was able to make a few changes to the construction I had learned as a child. These minor changes make it easier to construct and the properties are much more obvious.

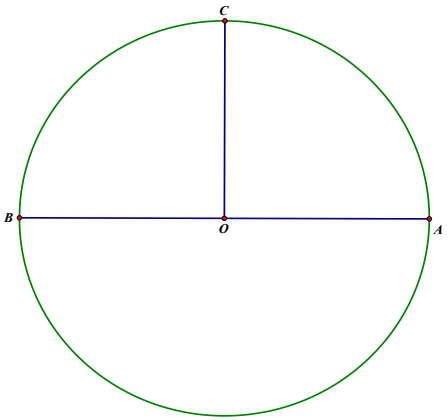
Constructing the Regular Polygon

I used Geometer's Sketchpad (version 5.03) to create my diagrams, but you may also use a compass and straight-edge to follow along.

Step 1

Construct a circle and label the center O.

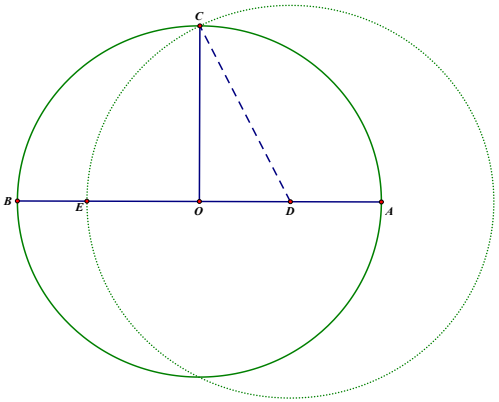
Construct a diameter and a radius perpendicular to the diameter. Label the endpoints A, B and C.



Dr. Eisele has taught mathematics at the elementary, high school, and college level for over 20 years. Her doctorate is in Elementary Education with a Mathematics Concentration. She also holds a master's degree in Mathematics Education. Her research interests are in the areas of math Anxiety, professional development of teachers, and ethnomathematics.

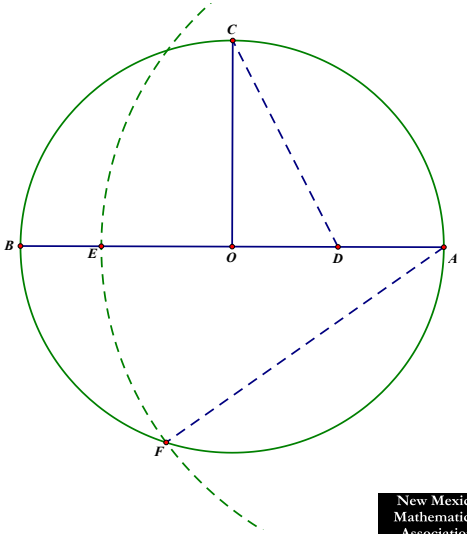
Step 2

Construct the midpoint of radius OA. Label the midpoint as D.
Using D as the center, construct an arc with radius DC.
Label the intersection with diameter AB as E.



Step 3

Using A as the center, construct an arc with radius AE, so that it intersects the circle.
Label the intersection as F.



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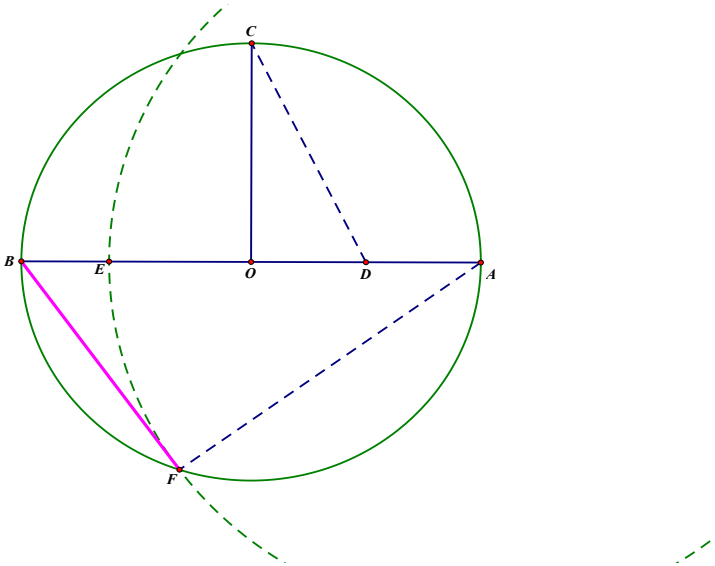
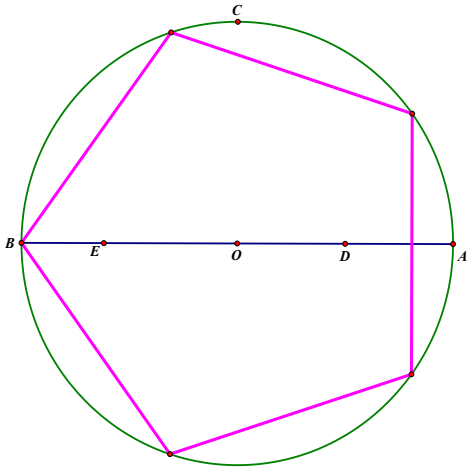
Step 4

Construct segment BF, this is one side of the regular pentagon.



Step 5

Construct segments congruent to BF around the circle.



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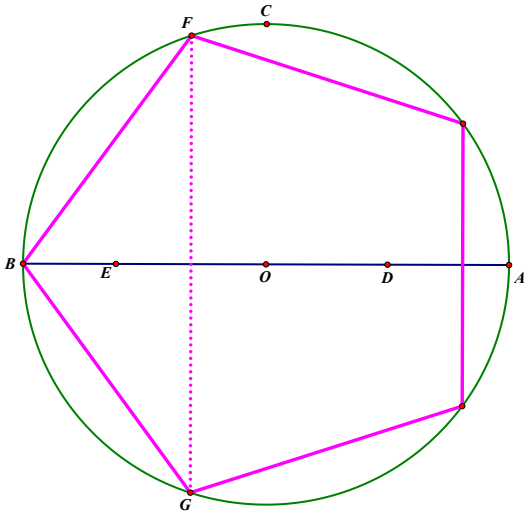
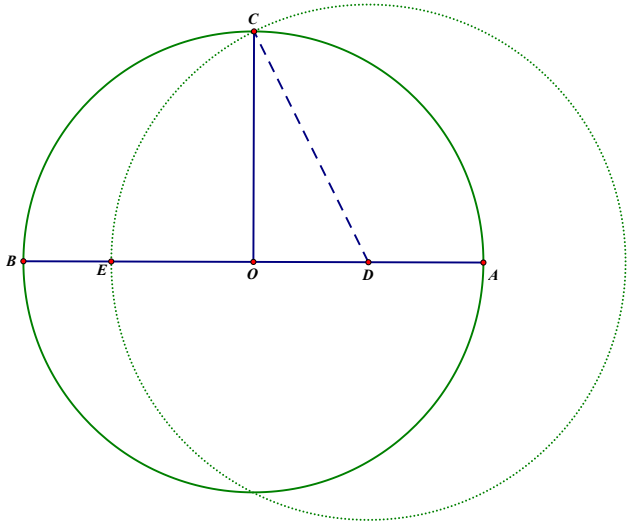
Informal Proof

Theorem: The ratio of a diagonal of a regular pentagon to a side is the golden ratio. I will actually be using the converse of this theorem to show that my construction is a regular polygon.

We need to show that the ratio of GF to BF is the golden ratio.



Let the radius of the circle = 1 . Then segment $OD = \frac{1}{2}$



Using the Pythagorean Theorem:

$$(CD)^2 = 1^2 + \left(\frac{1}{2}\right)^2 \qquad CD = \sqrt{\frac{5}{4}} = \frac{\sqrt{5}}{2}$$

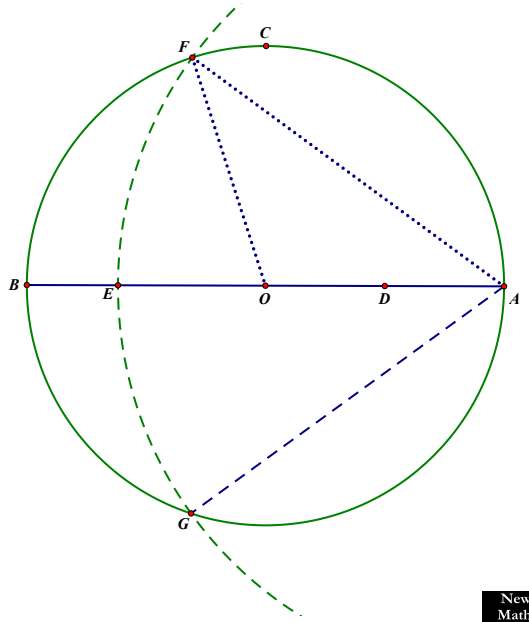
By construction, we know that $\overline{CD} \cong \overline{ED}$

We can also show that *AE* is equal to the golden ratio:

$$AE = ED + AD \qquad AE = \frac{\sqrt{5}}{2} + \frac{1}{2}$$

$$AE = \frac{\sqrt{5}+1}{2} = \varphi$$

We also know that $\overline{AE} \cong \overline{AF} \cong \overline{AG}$ because they are radii of the same circle.



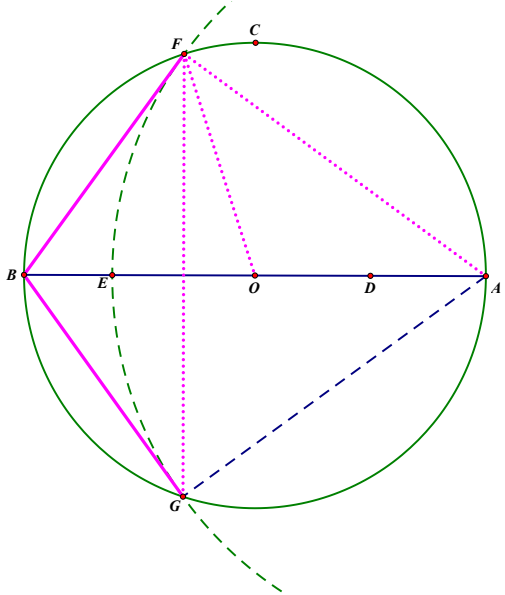
Sides OA and OF = 1 and side AF = φ
(golden ratio), so Triangle AOF is a golden triangle.

$\angle BAF \cong \angle BGF$ Inscribed Angles that intercept the same arc are congruent.

$\angle OAF \cong \angle OFA$ Base angles of an isosceles triangle are congruent.

$\angle BFG \cong \angle BGF$

$\Delta GBF \approx \Delta AOF$ AA



$$\frac{GB}{AO} = \frac{GF}{AF} = \frac{BF}{OF}$$

$$\frac{GF}{\varphi} = \frac{BF}{1}$$

$$GF = BF\varphi$$

$$\frac{GF}{BF} = \varphi$$

Therefore, the ratio of a diagonal to a side is the golden ratio.
This is what we needed to show.

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References

Smart, James R. *Modern Geometries*, *Fourth Edition.* Pacific Grove, California: Brooks/Cole Publishing Company, 1994.

Geometer's Sketchpad version 5.03. Key Curriculum Press, 2009.

Get Set for the 2012-2014 NMMATYC Officer Nominations

Becoming involved in the state two-year college math organization is a great way to get to know and interact with other math educators from throughout New Mexico and El Paso, Texas. Please consider nominating a current NMMATYC member (or self-nominate) for the position of President-elect, Secretary or Treasurer for the 2012-2014 term.

The President-elect position is a six year commitment; the first two years are as President-elect, followed by two years as President and concluding with two years as Past-president. This cycle ensures greater continuity for the organization and also allows for the individual to become familiar with the workings of the organization before becoming president. The Treasurer and Secretary positions are both two year commitments.

For the specific duties of the NMMATYC officers, please view the NMMATYC Constitution at www.nm.matyc.org. President Ali Ahmad (DABCC) or President-elect Philip Kaatz (Mesalands CC) may also be contacted for more information.

The deadline for nominations is January, 27, 2012.

Upcoming Conferences

37th Annual AMATYC Conference
(http://www.amatyc.org)
November 10—13, 2011
Austin, Texas

23rd Annual NMMATYC Conference
(http://www.nm.matyc.org)
May 18—19, 2012
Las Cruces, NM

What's New at El Paso Community College Transmountain Campus By Joanne Peeples

In May of 2011 the Transmountain Campus of EPCC had a ribbon cutting ceremony for two new "math rooms" – the new Math Lab and the new Math Emporium. The rooms still needed a bit of furniture, but the good news was that they would be open for Summer School. And, they will be ready and "tested" for the fall semester.

The Math Emporium room is well designed for emporium classes – it holds 32 student computers, has a large white board on one end, a screen on the other end, and room for the instructor and tutors to walk around and help the students. There is also a small room to the side where the instructor may have conferences with students. On the floor is a large ellipse – unfortunately it is mostly covered by computer stations, but since the ellipse is a bit lopsided and the major axis (determined by electrical outlets in the floor) is not exactly positioned correctly, perhaps that's a good thing.

The Math Lab is a large welcoming room – many windows, with views of the mountains. It has a white board at one end, with geometric tables and a projections screen (so we can have our Precalculus math labs at that end of the room). In the middle are bistro tables for studying (the height making it easier for the tutor to help). Our Lab Assistant's desk is at the far end of the room, with a curved "wall" that she can write messages on (like a white board), and behind the "wall" are a few chairs to accommodate a small study group.

There is also a small conference room off to the side of the main room where students can have a study group, or instructors can meet with a group of students.

The floors in both the lab and the conference have golden rectangles on them, and they show how to construct a golden rectangle starting with a square. I will say that the people laying the tile did not have an easy job – but, it really looks nice!

Just outside our biggest window is a seven foot tall, four foot wide sculpture created by one of our students, Mauricio Chacon. It is a "welcoming" Möbius Strip. It is made of iron, so it will rust to match our mountains and the outside color of our campus buildings.

We welcome visitors – we love to show it off!

Joanne Peeples
El Paso Community College
jpeeples@epcc.edu

New Mexico Mathematical Association of Two-Year Colleges

EPCC TRANSMOUNTAIN CAMPUS

Photos submitted by
Joanne Peeples
El Paso Community College

Math Lab Small
Conference Room

Math Emporium

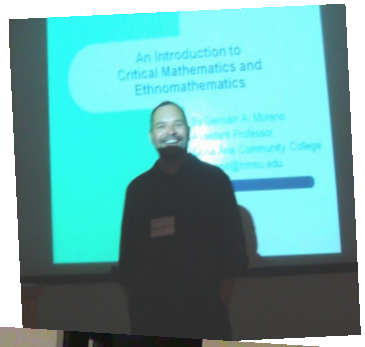
Mobius Sculpture

Tutoring Lab

NMMATYC CONFERENCE

Roswell, NM

May 18—19, 2011



Lucky Lady!

Submitted by Joanne Peeples

Solve:

$\sqrt[3]{2x-5}+3=1$

$\sqrt[3]{2x-5}=1-3$, subtract 3 from each side

$\left(\sqrt[3]{2x-5}\right)^3=(1-3)^3$,

whenever you want to eliminate a radical sign, just square both sides

$2x-5=1^2-3^2$

$2x-5=1-9$

$2x-5=-8$

$2x=-3$, add 5 to each side of the equation

$x=\frac{-3}{2}$

Math Humor

An insane mathematician gets on a bus and starts threatening everybody: "I'll integrate you! I'll differentiate you!!!" Everybody gets scared and runs away. Only one lady stays. The guy comes up to her and says: "Aren't you scared, I'll integrate you, I'll differentiate you!!!" The lady calmly answers: "No, I am not scared, I am ***e^x*** *."*

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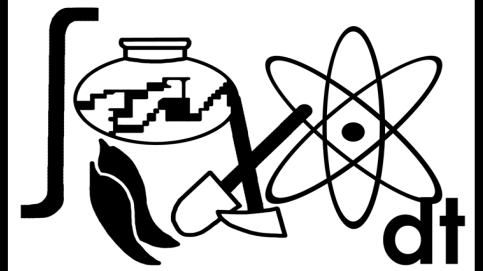
New Mexico Mathematical Association



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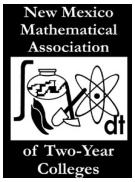

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