



Director: Richard Waring
Mathematics Coordinator: Richard Delaware

August 1, 1995

Vol. 10, No. 1

YEAR 12 - A DOZEN SCHOOLS

Fresh from the summer, returning to bright, newly-painted hallways, we begin this year with 80 students (of which 43 are female), a number second only to the 86 that greeted us last year, coming from a record 12 schools: Fort Osage, Truman, Wm. Chrisman, East, Northeast, Van Horn, Metro, Southeast, Paseo, Lincoln, St. Mary's, and Lutheran High Schools! But, in spite of this large group, we have decided not to split them into 5 sections as we did last Fall, an idea which proved difficult to staff and maintain. With only 4 sections [see the 1995-96 section listings below], we can proceed more smoothly, and although some intimacy is lost at first and Physics Labs will be a bit cramped [we have only 9 full set-ups], we have enough computers, graphics calculators, and faculty to compensate, while maintaining our high standard of quality.

Some miscellaneous over-the-summer news: ■ All MPI materials and programs written for our graphics calculator of choice, the SHARP EL-9300C, have been gathered into a single yellow MPI manual, to join the previous manuals for Calculus I and Calculus II computer labs, as well as an MPI Physics manual, also new this year. ■ We have installed a second projection screen in one front corner of each classroom, so that we can now project, say, information from an overhead projector or a computer screen, while leaving the blackboard uncovered for simultaneous use, which we hope will make for a more dynamic classroom. ■ Otherwise, our building continues to change around us with the advent of tenants such as the UMKC-based Center for Business Innovation, the Regional Police Academy, paramedic classes, the Independence School District's Impact program for gifted 2nd to 6th graders, the 21st Century child care

program, and more. We are now, believe it or not, the oldest (!) tenant in this building, and are looking forward to our 12th class.

MPI STUDENT ORIENTATION SEPT. 6 - 8, 1995

Each year the first three days at the MPI are spent in giving our students an overview of how we operate, a discussion of our policies on attendance, grading, etc., and two diagnostic tests. Time is then set aside for the instructors to informally 'get to know' their classes before we all become preoccupied with class work.

In particular, on the first day, Sept. 6, 1995, we'll provide each student with a packet of information and have each of them fill out a personal data form.

**PLEASE BRING, ON SEPT. 6,
7 am, TO ROOM 207**

- Your Social Security Number.
- Your daily schedule of high school classes.
- Your schedule of extra-curricular activities.
- Your counselor's name.
- Car license number, make and model, for those ever planning to drive to the MPI.
- Ideas for Enrichment Speaker topics.

We look forward to seeing our 12th class on Wed. Sept. 6!

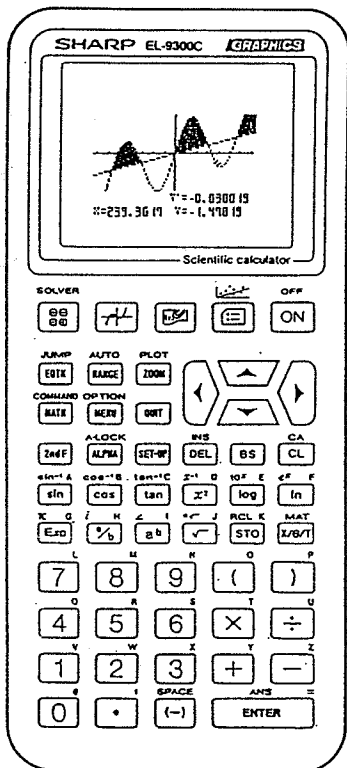
MPI E-MAIL ADDRESS:

rdelaware@cctr.umkc.edu

A list of known MPI Alumni e-mail addresses is available on request.

**SHARP EL-9300C
GRAPHICS CALCULATORS**

The MPI requires ALL students to have and use a graphics calculator in both physics and calculus, and for our purposes we have selected the SHARP EL-9300C. Although it is not the most powerful such graphics calculator on the market, it is ideally suited to the MPI, and its selection of students.



All MPI students are required, within the first two weeks, by Friday Sept. 15, either to rent a SHARP from us, paying a \$10.00 one-time, non-refundable fee for the entire academic year, with an option to buy the calculator outright at any time [the full price, after the rental fee is deducted, is \$55.00], or to provide themselves with a better graphics calculator, specifically either a TI-85 or an HP 48G.

[Information, including cost, on all these graphics calculators can be gotten from the MPI Mathematics Coordinator by calling 235-1290.] These rented calculators will initially be loaded with a set of 4 AAA batteries, but as these fail over the course of the year, student-renters are entirely responsible for buying and replacing them. (Our experience has been that at most one or two replacements are needed over the year.)

At the beginning of Year 11 (1994-95), 71 MPI students rented our SHARP EL-9300Cs, and at year's end, 22 bought them. 3 MPI students used their own TI-85 all year.

**TO ALL MPI ALUMNI:
HAVE YOU GRADUATED
FROM COLLEGE?**

**IF SO:
PLEASE CONSIDER BEING
AN MPI ENRICHMENT SPEAKER!**

CALL (816) 235-1272

**1995 MPI AWARDS PRESENTATION
AND
TOP 10 MPI STUDENTS OF 1994-95**

Our final awards presentation was held on May 18, 1995, during which we were pleased to present many of our 1994-95 students with the following variety of awards:

Certificates for Outstanding Achievement (college grade of A or B):

CALCULUS I

(Name)	(School)
Peter Anderson	Wm. Chrisman
Jennifer Brown	Wm. Chrisman
Rachael Gard	Truman
Leslie Gross	Ft. Osage
Brian Hampton	Wm. Chrisman
Joe Dee Haney	Wm. Chrisman
Randon Kent	Wm. Chrisman
Dana Kliethermes	Truman

Nicole LanFranca	Truman
Filipa Leite de Castro	Truman
Pamela Moseley	Wm. Chrisman
Jennifer Musil	Truman
Aimee Newell	Wm. Chrisman
Derek Olson	Ft. Osage
Kathy Owen	Truman
Jennifer Stafford	Truman
Brian Stuck	Wm. Chrisman
Marlene Toole	Ft. Osage
David Visnich	Ft. Osage
Jennifer Woolsey	Northeast
Samuel Young	Ft. Osage

CALCULUS I and II

Amy Bentz	Truman
Eric Huss	Truman
James McIntosh	Truman
Rachel Roberts	Truman
Rebecca Schwietz	Ft. Osage
Ted Verren	Ft. Osage

PHYSICS

Amy Bentz	Truman
Amy Coop	Wm. Chrisman
Angelynn Eickhoff	Truman
Rachael Gard	Truman
Leslie Gross	Ft. Osage
Brian Hampton	Wm. Chrisman
Eric Huss	Truman
Nicole LanFranca	Truman
Ahmad Latifzai	Van Horn
Greg Long	Van Horn
James McIntosh	Truman
Pamela Moseley	Wm. Chrisman
Jennifer Musil	Truman
Aimee Newell	Wm. Chrisman
Derek Olson	Ft. Osage
Rachel Roberts	Truman
Brian Stuck	Wm. Chrisman
Vaitafemoni Tonga	Truman
Marlene Toole	Ft. Osage
Ted Verren	Ft. Osage
David Visnich	Ft. Osage
Jennifer Woolsey	Northeast

We also honored the TOP TEN students (ranked according to the mean of their full-year college calculus and physics grades) by giving them a one year subscription to Scientific American magazine, a copy of the May issue of Scientific American, and a copy of "What's Happening in the Mathematical Sciences":

TOP 10 MPI STUDENTS 1994-95

1) Rachel Roberts	Truman
2) Pamela Moseley	Wm. Chrisman
3) Derek Olson	Ft. Osage
4) David Visnich	Ft. Osage

5) Brian Stuck	Wm. Chrisman
6) Eric Huss	Truman
7) Amy Bentz	Truman
8) James McIntosh	Truman
9) Rebecca Schweitz	Ft. Osage
10) Jennifer Musil	Truman

Finally, we list those MPI students planning to attend UMKC who received various scholarships from UMKC; included here are those students to whom the MPI awarded Chancellor's Scholarships:

UMKC Chancellors Award Winners:

Jennifer Brown	Wm. Chrisman
Rosa Nuñez	Northeast
Marlene Toole	Ft. Osage
Vaitafemoni Tonga	Truman
Hattie Williams	Van Horn

UM Curators Award Winners:

Anne Croston	Ft. Osage
Rachael Gard	Truman
Brian Hampton	Wm. Chrisman
Eric Huss	Truman
James McIntosh	Truman
Pamela Moseley	Wm. Chrisman
Nicole LanFranca	Truman
Derek Olson	Ft. Osage
Phillip Prince	Wm. Chrisman
Rebecca Schwietz	Ft. Osage
Jennifer Stafford	Truman
Brian Stuck	Wm. Chrisman
Marlene Toole	Ft. Osage
Ted Verren	Ft. Osage
Samuel Young	Ft. Osage

ADVICE TO STUDENTS OF YEAR 12 FROM THE STUDENTS OF YEAR 11

At the end of this last year, in May, we decided once again to have our students write however much they wanted in answer to the question:

"What ADVICE would you give to incoming students about study, attitude, or any other aspect of surviving the MPI in 1995-96?"

We were pleased at how seriously and with what maturity they wrote, and so each incoming student will receive a complete set of these words of advice from the students of Year 11. Here are some excerpts from that document:

"For those of you who have always received A's in math and science without studying, this is different (especially for those of you in Section C). Either establish good study habits quickly or learn to settle with not getting an A. Don't get discouraged if you do poorly on the first test - a lot of people do because they are not used to the studying. Stick with it and spend several hours a week studying, otherwise, you will not succeed. Work with the students from other schools - form study groups, get to know each other. It always helps to be around people with similar goals and challenges."

Peter Anderson
Wm. Chrisman High School

"Make this decision: You will either do your best and give all your effort to MPI; or you will not take MPI at all. As I found out, to succeed at MPI, there can't be any hesitation."

Huu Dang
Northeast High School

"If you're not up for a challenge you don't belong here. MPI is difficult and it is nothing like high school classes. If you get behind, realize that the course does not wait for you to catch up. Be on top of assignments and don't put them off to the last minute. If you're like I am it doesn't matter what anyone tells you, you have to experience for yourself. If you get any message from this, hopefully it will help. One other thing - NEVER SLEEP IN CALCULUS!"

Angel Eickhoff
Truman High School

"First of all I say **RUN WHILE YOU STILL CAN!** No, I'm kidding. Honestly, in order to survive it here, you have to be completely ready to study, study, study. I can't count the number of weekends I've spent studying for calculus and physics exams. I really encourage you to find someone here you can study with. It somehow makes everything less painful. Believe it or not my friends and I have become extremely close because of MPI."

Keeping a good attitude is also crucial. It's so easy to fall behind and to just give up. Don't do it. Give it all you got, and really try to learn something. The information may be difficult, but it is interesting. Pay attention to directions, and take advantage of problem solvings. They provide you ample opportunity to succeed, it's up to you to make the most of it."

Rachael Gard
Truman High School

"Be prepared! Don't miss any classes if possible. The effort put forth at the MPI will surely prepare you and propel you into the future! The early mornings and lectures will get difficult along with the tests, but stay with it. A good attitude and strong study skills will lead you straight to success. Strive for your goals, but be prepared for anything!"

Doug Hallmon
Northeast High School

"When I was reading the advice from the previous years, I thought ooh well I'm special. I figured I could take the classes like high school classes and still do well. I got college B's first semester. I did all right. Now second semester I think I'll get C's. Friends of mine have studied. They are getting A's. So it depends on your goals for MPI. If you want an A you will study. If you want a B you'll study from time to time. If you don't study at all you'll get C's or lower."

Joe Dee Haney
Wm. Chrisman High School

"Get your study skills down at the beginning of the year because if you don't, then you probably never will. Be prepared to sacrifice some of your personal time."

Nathan Haynes
East High School

"The advice I would give to incoming students is to study and to never give up. At the beginning of

the year your grade won't be very good but, if you study and keep trying you will succeed."

Antonio King
Van Horn High School

"To those of you jumping in with both feet and eyes closed, WAKE UP! These courses are nothing like high school; they're harder. Prepare yourself to work hard, and to tax your brain to the limit and beyond. Study, study and study harder! Don't slack off, keep working on the homework, labs, and everything. Adopt the attitude that you'll do good and you will. No matter how hard it looks don't ever give up!"

Crystal McNeil
Northeast High School

"This does require work!! You may be able to sleep through high school classes and still get the highest grade in the class, but you can't do it here. My advice is to learn what the best way to study is for you. If you figure that out and practice it, the tests will get easier and easier. Another thing (thought you probably DON'T want to hear it), do the homework problems in calculus even though they're only "suggested". (They are suggested for a reason!) Take advantage of your problem solving sessions by asking questions, and find study groups that help you (they can definitely be fun!)."

Pamela Moseley
Wm. Chrisman High School

"I found that sitting through lecture doesn't mean you understand the material. You have to read the text and explain it to yourself. Work only problems you don't know how to do. Don't waste time on easy brainless problems, if you want to do good on tests you have to do the harder suggested problems. Learn concepts and try to imagine what type of problem will be on the test. If possible, the best help is going over old tests. Cramming the day or two before a test is not bad. It always helped me. Prioritize between your classes and don't overwork yourself. Have Fun?"

Brian Stuck
Wm. Chrisman High School

THE 1995-96 CLASS (TO DATE)

Section A

Narina Arutyunova	Southeast
Chris Bundridge	Metro
Erin Butherus	Wm. Chrisman
Gina Calvert	Van Horn
Heather Cater	Truman
Katie Don Carlos	Ft. Osage
Nathan Durgan	Van Horn
Cris Dykeman	Wm. Chrisman
Benetta Fairley	Northeast
Anna Garriock	Paseo
Trey Gray	Ft. Osage
Josh Harrington	Truman
Anneatrica Hicks	East
Carletta Johnson	Northeast
Sierra McDaniel	Truman
James Nguyen	Northeast
Quoc Nguyen	Northeast
Frankie Pircher	Truman
David Saxton	Van Horn
Krongthep Vongviset	Van Horn
Jason Wyatt	Northeast
Sam Yoo	Ft. Osage
Roland Zinne	Van Horn
Joseph Ziolkowski	Van Horn

Section B

Risala Allen	Van Horn
Amanda Benavidez	Northeast
Khampheth Bounmiswang	Van Horn
Jon Robert Ellis	Truman
Yuliya Galochkina	Northeast
Raemone Grigsby	Van Horn
Christina Jensen	Wm. Chrisman
Nigel Johnson	Northeast
Aaron Jones	Truman
Justin Langston	Ft. Osage
Estella Macke	St. Mary's
Genny Malino	Ft. Osage
Heide Miller	Ft. Osage
Thanh Nguyen	Northeast
Phuong Nguyen	Northeast
Rochelle Owens	Lincoln
Aaron Paprocki	Wm. Chrisman
Centoria Roulette	Van Horn
Alex Ruthman	Paseo
Matt Sheffield	Ft. Osage
Lora Shockley	Van Horn
Nicole Taylor	East
Aletha Wand	Van Horn
Jennifer Wrinkle	Truman

Section C

Corey Baker	Truman
Ragan Buckley	Truman
Julie Domsch	Lutheran

Erica Hernandez	Lincoln
Donald Vaught	Ft. Osage
Chad Vermeland	Ft. Osage
Jennifer Watts	Truman
Harley Winfrey	Ft. Osage

Section D

Alex Bates	Ft. Osage
Holly Brown	Northeast
Leslie Cage	Van Horn
Robert Davis	Ft. Osage
Kevin Dooley	Truman
Greg Finke	Truman
Philip Ford	Van Horn
D'Nae Gardner	Paseo
Rebeca Hernandez	Northeast
Beth Hontz	Wm. Chrisman
David Lee	Truman
Kris McGinley	Van Horn
Anna Naples	Ft. Osage
Tien Nguyen	Northeast
Scott Preston	Wm. Chrisman
Lana Scoggins	Northeast
Aaron Shrout	Ft. Osage
Sienna Sifuentes	St. Mary's
Christen Smith	Van Horn
Justin Thomas	Northeast
Bahiyah Thornton	Lincoln
Asmerom Tsegai	Van Horn
Melinda Woolsey	Northeast
Victor Wong	Truman

These are the total of 80 students (as of this newsletter) who will be enrolled. As usual there will be additions and deletions through September.

THE 1995-96 STAFF

In PHYSICS:

Larry Harding from Fort Osage, **Jim Graczyk** from Van Horn, with some assistance from **Roy Cook** of Northeast,

and, in CALCULUS:

Sheri Adams from Truman, **Tina Knutson** from East, and **Al Morse** (retired), formerly from Wm. Chrisman.

Our University staff is listed in the heading of this newsletter, and our half-time secretary and assistant is **Doris Kirst**.

MPI T-SHIRTS!

Beginning in about October, we will once again be selling bright

blue MPI T-shirts and sweatshirts to our students. These shirts have a classy 3D graph ($z = \cos x \cdot \sin y$) on the back and our student-designed MPI logo on the left front.

ENRICHMENTS

FOLLOW UP

On **March 24** Kim Moehle, Beth Rice, and Dr. Stephen Slack from the Midwest Gamma Knife Center at Research Medical Center in Kansas City spoke on **NEUROSURGERY FOR THE 21ST CENTURY: THE GAMMA KNIFE**.

Student comments were:

--The Gamma Knife is a high tech machine that can help or cure cancer and other ailments in the head. The technology used to create it was available about 40 years ago, but there was not a targeting system then. The Gamma Knife precisely zaps cancer in the head with a high level of Gamma radiation. Only one treatment is given. The results of this treatment does not show until about six months.

--A specially precise form of radiosurgery. Radiosurgery is the crossfiring of narrow beams of ionizing radiation through a target within the body to inactivate thromboses or necrose particular tissue while sparing its surroundings. Brain surgery without an incision.

--For lesions in the brain there is an exciting and growing option in treatment: the gamma knife. This radiation therapeutic process uses a high dose of radiation in a very exact location to kill tumors and/or cancers more effectively than in several doses spread out over a long period of time. Gamma knife radiation therapy can be used to treat metastasized cancers, blood vessel swelling, acoustic inflammations, and other brain lesions. This procedures lasts only a day and has a high success rate for difficult maladies like melanoma. It was really interesting! Great slides and presentation!

--The physicist told us how the gamma knife has limited the effects of radiation on the body. The nurses also gave us insight on how treatment is provided after the operation.

On **April 28** JeriAnn Payne, a Civil Engineer, spoke on **HIGHWAY SLOPE DESIGN**.

Students responded:

--I found this enrichment to be informative and full of important information about civil engineering. I felt that it gave good background for anyone with thoughts of going into engineering. It never occurred to me how much civil engineers really do. I was also impressed that they take care to protect the environment when they plan their highways. I can't think of anything I would change.

--Civil engineers address a variety of problems involving transportation, architectural, and environmental concerns. The speaker works with highway design, including the planning and design for existing and new roadways. Highways must be carefully planned to accommodate traffic flow and available space to expand and/or develop. Great slides!! Nice use of technology with computer simulations.

--Designing highways requires attention to every particular detail--radii, angles, time. Absolutely everything needs to be planned out. They do their designs in 3-D to make visualization easier. Interesting!

--She talked about road construction and the mathematical steps involved in designing a road. From here they make pictures of slices of the road and design what land they have to cut out or add. They have to figure the angles needed for the curves in the road and intersections. A lot of math is needed in the construction of even a basic highway. It was good. I enjoyed her presentation. I was surprised about how much work is needed to build a highway.

UPCOMING

One of the special features of the MPI is its biweekly enrichment series, in which on alternate Fridays either professionals in the sciences, engineering, mathematics, etc., speak to our MPI students, or, we take a field trip to such places as the nuclear research reactor in Columbia,

UMKC's Physics Dept., or Worlds of Fun for some 'hands on' physics.

The October 1 newsletter will report on those speakers scheduled for October and beyond. But, during the first two weeks of classes at the MPI we will spend one day discussing a topic which is vital for study and college survival. Specifically: **TIME MANAGEMENT**. This session will be presented by Augusta Nichols from UMKC's Academic Support Services on **Friday, Sept. 8**.

As part of our early MPI orientation, Debra Gaggens of UMKC, will speak on **Friday, Sept. 15** about college admissions in general, and the importance of thinking about applications EARLY. (This is not intended to be a recruitment for UMKC, but a general discussion to help sensitize our students to the importance for colleges of deadlines.)

On **Sept. 29**, Mitch Dobson (MPI 89-90), currently the resident Prosthetist/Orthotist at Certified Orthotics and Prosthetics Associates in Lenexa, KS, will speak on **PRINCIPLES AND ADVANCEMENTS IN PROSTHETIC TECHNOLOGY**.

TO THE PARENTS OF THE 1995-96 CLASS AT THE MPI

[Modified from the August 1, 1987 newsletter.]

This newsletter is written for YOUR information, and there will be one sent to you every two months during this year while your son or daughter is at the MPI.

We firmly believe that without your support and concern at home students cannot succeed in such a rigorous program as the MPI. Our classes are NOT high schools classes, and require both study skills and a commitment that students still in high school, however talented, have not experienced before. In both of these areas YOU as parents can be of enormous help.

One of the first facts we have learned to face in the last eleven years is that many bright students never learn to study efficiently; they have often gotten along very well with a 'wait and cram' attitude, giving textbooks only an occasional

cursory look in time for testing, and relying on their innate ability to absorb information and skills in the classroom. However, in coming to the MPI these same students always find themselves at first, and suddenly, falling behind.

In general, in college classes MORE MATERIAL is covered, and MORE SKILL with concepts is required, i.e., **THINKING** is expected regularly. This comes as a shock to many talented students. One of the MPI's goals is to expose students to this shock, and help them overcome it by learning effective study skills in actual practice. But YOU as parents can help this transition enormously, by suggesting that your children actually spend the minimum of one hour per subject, per night of study that we here at the MPI urge. They must come to realize that longer study times reflect the new rigor of the COURSES, not their lack of talent. This is a point of view that many students find hard to accept at first. Your encouragement can help them over this hump. Encourage them to seek the help of all the teachers involved in the program, and to put aside the false idea that only remedial students need to TALK about mathematics and physics. The fact is that true understanding comes only from learning to discuss and explain a subject, and this is ESPECIALLY SO in physics and mathematics.

Finally, we urge you to call us if you ever have a question, and we hope that you will find time to visit the MPI during our annual **OPEN HOUSE** on Sunday afternoon, **November 5, 1995**. (More about this in the October newsletter.)

WE HEAR FROM PAST STUDENTS

ERIC BAKER (85-86)
(BA, Biology/Chemistry;
MD, Medicine)

"I'm (finally) nearing completion of my education and I thought it would be good to write. At the end of the month I will finish residency in Internal Medicine through UMKC. This completes nine years of training in what looks like now to be a wonderful job and career; I hope that my expectations for the future are true. It has been somewhat an awesome task but definitely enjoyable. As a payback

for a scholarship my next step will be to enter active duty for three years with the United States Air Force. I'll be stationed at Scott Air Force Base in Illinois and this too looks to be exciting. The base has a Family Practice residency and as a staff member there part of my responsibility will be to educate the residents and oversee some of their work. I've found with working with medical students that teaching is a lot of fun.

Just wanted to drop a line and 'update' you on one of your former students. I thank you for help in getting me to where I'm at and wish you the best in your continued teaching."

ALAN CANFIELD (86-87)
(BS, Mechanical Engineering;
Grad. Student, Florida State Univ.)

"I attended MPI in 1987 from Wm Chrisman High School. Last time we all spoke I was working in Kansas City, MO after graduating from MU with a BSME, and I was at UMKC working on an MSME. Now I am in Panama City, Florida, working on contract to the Air Force at Tyndall AFB as an Environmental Engineer.

I still appreciate the newsletter, and exercise my brain with the problems sometimes. Also exercising my brain as a part-time grad student at FSU, still working toward an MSME. I will try to send a better "Hello" to possibly put in the newsletter later, to say Hi to everyone. Thank you, and best wishes."

CHRIS BIRD (90-91)
(BS, Biochemistry)

"MPI had some of the best instructors that I have had throughout my college career. I have had good ones at MU and UMKC, but MPI classes started my college career off on a good footing."

JEFF SCHREINER (92-93)
(Political Science Major)

"I look back with great memories at MPI. Whether or not one chooses to build upon the courses is

Mathematics and Physics Institute

CALENDAR 1995 - 1996

MPI Begins	September 6, 1995
Mid-1st Quarter Progress Reports Sent	October 6, 1995
1st Quarter Grade Reports Sent	November 2, 1995
MPI OPEN HOUSE for Parents/Teachers/etc.	Sunday, November 5, 1995
Thanksgiving Holiday	November 23-24, 1995
Mid-2nd Quarter Progress Reports Sent	December 15, 1995
Christmas Holiday	December 20, 1995 - January 1, 1996
MPI Classes Resume	January 2, 1996
MPI REUNION & PANEL DISCUSSION	January 3, 1996
Final Exam - Calculus I - (Math C Only)	January 11, 1996
Martin Luther King Holiday	January 15, 1996
2nd Quarter/1st Semester Grade Reports Sent	January 16, 1996
Mid-3rd Quarter Progress Reports Sent	February 16, 1996
Presidents' Day Holiday	February 19, 1996
3rd Quarter Grade Reports Sent	March 21, 1996
MPI Spring Break	April 1-5, 1996
MPI Classes Resume	April 8, 1996
Mid-4th Quarter Progress Reports Sent	April 19, 1996
Final Exams - Calculus I (A, B, D) and Calculus II (Math C Only)	May 13, 1996
Final Exam - Physics (A, B, C, D)	May 14, 1996
MPI Picnic Breakfast (McCoy Park)	May 15, 1996
MPI Awards Presentation/Last Day of Classes	May 16, 1996
4th Quarter/2nd Semester Grade Reports Sent	May 17, 1996

irrelevant. The exposure to high level material and professional college level teaching helps to prepare students for the difficult transition to college life. I would emphasize the use of computers and other technology. Even here (at the US Air Force Academy), where everyone is required to purchase a computer, few can operate even the simplest of programs effectively. I would like to thank the MPI staff for everything they gave me."

GREG ANDREWS (92-93)
(Biology Major)

"Although the MPI courses are much harder than most high school courses, they still do not cover as much as college courses do. However, I believe that this is exactly what is needed to help with the transition from high school to college. The MPI pushes the student to achieve more academically, through self motivation, while also providing caring instructors to help push you along. This institution was the best tool that aided me in this big transition, and I think that this clearly shows the quality of MPI."

AMANDA KOSTER (92-93)
(English and German Major)

"Actually with my change in major(s), my MPI experiences have had more of an impact than I thought possible. (The straight credit hours fulfill my math and science core requirements here (at NMSU), and combined with my AP test they give me enough credits to be considered a junior my second year here.) My classes in math and science have given me a slightly different point of view than most language majors have. I can understand (and consequently use) enough of the basic physics laws to be able to write reasonably realistic science fiction. I also have a basis for more in-depth research, should I choose to do so. My calculus got me into advanced biology and chemistry classes my freshmen year. The knowledge and the gaps in knowledge that I discovered provide ample building material for writing both fictional and non-fictional. I have also gotten a wide exposure to the various realms of math and science through the MPI

enrichments. Many of my friends envy me the trips and info we got.

I had a wonderful experience at the MPI. It helped ease my transition to college. I was somewhat prepared for my 3-hour biology labs, and 3-hour stool-less chemistry labs during my freshman year. I also managed to avoid (mostly) NMSU's notoriously very bad or very good math staff. I also find I actually remember much of my calculus - enough to help some of my friends this year. (Kudos to Mrs. Adams and Mr. Morse - I didn't think it was possible!)"

AUBREY HANKS (93-94)
(Psychology Major)

"I learned at MPI not to procrastinate. The night before the exam is not the time to begin working problems, reading, etc. College is demanding and you can't let yourself get far behind.

MPI helped me in my abstract thinking or 3-D visualization. (Especially those rotating cylinders in calculus!) I understand physical concepts better, which helps in my chemistry courses.

MPI increased my self-esteem by giving me a sense of accomplishment. I also felt more comfortable about college courses and exams thanks to my MPI experience.

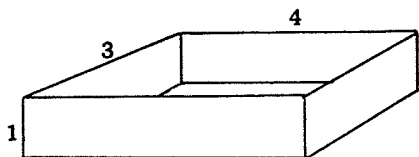
MPI gave me a change of pace. It was nice to not be in high school all day. MPI required a lot of responsibility and I felt a sense of maturity. However, the best thing was meeting all of my current friends from other schools."

A SOLUTION TO MATHEMATICS CHALLENGE #38

Recall the problem statement:

A man has a bowl (not pictured) that holds a little more than a pint, and a flat rectangular straight-sided pan that holds exactly a pint, as shown below. He wants to put exactly $\frac{1}{3}$ of a pint of water into his bowl, but he has no other means of

measuring anything. He does have a supply of water and an ordinary kitchen table with an exactly level surface. How can he do it?



[From: Mathematical Brain Benders, by Stephen Barr]

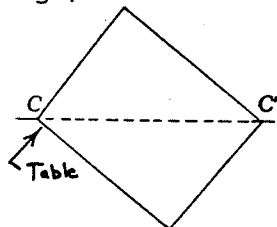
SOLUTION:

He fills the pan on the table more than half-full, and then carefully tilts up one end, pouring out the water, until the level reaches *E*, the bottom edge of the raised end.



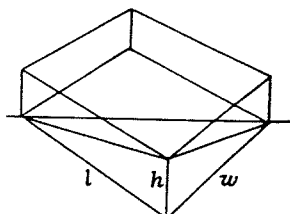
This leaves exactly 1/2 pint in the pan, since the empty part is the same shape and size as the filled part.

Being an ordinary kitchen type, the table has a straight edge. The man slides the pan over the edge so that the opposite corners, *C* and *C'*, coincide with the edge,



and starts tilting again, with the bowl held to catch the water. He tilts until the surface of the water coincides with the corners *C* and *C'*. The bowl now contains 1/3 pint.

(Transparent View)



Proof:

The proportions of the pan are irrelevant! The last figure shows

the pan at the end of pouring. The remaining water is in the form of a pyramid, the volume of which equals the area of the base times one-third its height. Here the area of base is

$$\frac{lw}{2}, \text{ so, volume} = \frac{lw}{2} \cdot \frac{h}{3} = \frac{lwh}{6}$$

Since the volume of the pan (1 pint) is lwh , the remaining water is 1/6 pint.

Thus, he poured into the bowl $1/2 - 1/6 = 1/3$ pint, as desired.

A SOLUTION TO PHYSICS CHALLENGE #29

Recall the problem statement:

A dime is on the table beside a glass of water. Hand someone a straw and say, "Betcha can't pick up the dime with this straw and drop it into the glass."

Follow this with, "Betcha can't drop the dime several inches to the table so it lands and stands on its edge."

How would you do these and so win your bets?

SOLUTION:

Put a drop of water on the dime. With the straw in your mouth, bend over so the other end presses vertically on the dime. When you draw in air, the dime will adhere to the straw, allowing you to carry it over to the glass and let it fall in.

Dip the dime in the water and push it against the side of the glass near the brim. [The glass must have straight sides.] When you let go, the dime adheres to the glass, slides down the side to the table, and remains on its edge.

[From: The Physics Teacher, Jan. 1995, p. 51, by Martin Gardner]

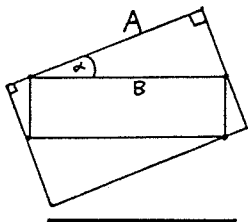
MATHEMATICS CHALLENGE #39

For any rectangle, let's define the "Eccentricity" of the rectangle

to be the ratio of its larger side to its smaller. [So squares have Eccentricity = 1, and all other rectangles have Eccentricity > 1.]

Show that if rectangle B is inscribed inside rectangle A, so that each vertex of B is on a different side of A, then the inequality below holds:

Eccentricity of A \leq Eccentricity of B.

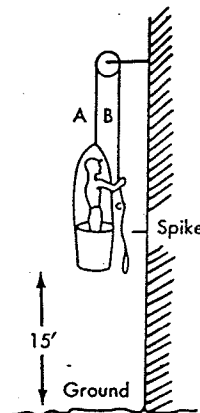


[From: Quantum Magazine, May/June 1995, p.19]

PHYSICS CHALLENGE #30

A man is standing in a bucket that is attached to the end of a rope, A, which goes over a pulley, and he holds the other part, B. In front of him is a wall. The part of the rope, C, that is below his hand is 5 feet long, and has a loop on its end. He wants his lunch. He is tired of holding that rope. He lets himself down until he is holding the loop, which he slips over a convenient spike in the wall. The whole rope is 25 feet long and is slightly elastic, so that at the first stage (shown here) the A and B part of the rope is stretched to its maximum extent - and to within 90% of

breaking point - and he is 15 feet from the ground. The rope stretches one inch per foot. How far is he from the ground after he hooks the rope over the spike? (Ignore the loop.) Give your answer to the nearest half inch.



[From: Intriguing Puzzles in Math & Logic by Stephen Barr.]

Editor/Writer: Richard Delaware

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