

# Mathematics Council NEWSLETTER

The Alberta Teachers' Association

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## From the Editor



Although handheld calculators have been around for 25 years, considerable controversy still exists regarding students' use of them in mathematics classes. We must realize that, for all

intents and purposes, all students have access to them. Therefore, the teacher's responsibility is to help students use them appropriately. Certainly, it is a disaster when we see junior high students using a calculator to determine the value of  $6 \times 9$ . NCTM has developed an excellent position paper on the effective use of calculators as outlined in the following.

## Calculators and the Education of Youth

Calculators are widely used at home and in the workplace. Increased use of calculators in school will ensure that students' experience in mathematics will match the realities of everyday life, develop their reasoning skills and promote the understanding and application of mathematics. The National Council of Teachers of Mathematics therefore recommends the integration of the calculator into the school mathematics program at all grade levels in classwork, homework and evaluation.

Instruction with calculators will extend the understanding of mathematics and will allow all students access to rich, problem-solving experiences. This instruction must develop students' ability to know how and when to use a calculator. Skill in estimation and the ability to decide if the solution to a problem is reasonable are essential adjuncts to the effective use of the calculator.

Evaluation must be aligned with normal, everyday use of calculators in the classroom. Testing instruments that measure students' understanding of mathematics and its applications must include calculator use. As the availability of calculators increases and the technology improves, testing instruments and evaluation practices must be continually upgraded to reflect these changes.

NCTM recommends that all students use calculators to

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- explore and experiment with mathematical ideas such as patterns, numerical and algebraic properties, and functions;
- develop and reinforce skills such as estimation, computation, graphing and analyzing data;
- focus on problem-solving processes rather than the computations associated with problems;
- perform the tedious computations that often develop when working with real data in problem situations; and
- gain access to mathematical ideas and experiences that go beyond those levels limited by traditional paper-and-pencil computations.

NCTM also recommends that every mathematics teacher at every level promote the use of calculators to enhance mathematics instruction by

- modeling the use of calculators in a variety of situations;
- using calculators in computation, problem solving, concept development, pattern recognition, data analysis and graphing;
- incorporating the use of calculators in testing mathematical skills and concepts;
- keeping current with state-of-the-art technology appropriate for the grade level being taught; and
- exploring and developing new ways to use calculators to support instruction and assessment.

NCTM further recommends that

- school districts conduct staff development programs that enhance teachers' understanding of the use of appropriate state-of-the-art calculators in the classroom;
- teacher preparation institutions develop preservice and inservice programs that use a variety of calculators, including graphing calculators, at all levels of the curriculum;

- educators responsible for selecting curriculum materials make choices that reflect and support the use of calculators in the classroom;
- publishers, authors, and test and competition writers integrate the use of calculators at all levels of mathematics; and
- mathematics educators inform students, parents, administrators and school boards about the research that shows the advantages of including calculators as an everyday tool for mathematics students.

Research and experience have demonstrated the potential of calculators to enhance students' learning in mathematics. The cognitive gain in number sense, conceptual development and visualization can empower and motivate students to engage in true mathematical problem solving at a level previously denied to all but the most talented. The calculator is an essential tool for all students of mathematics. ▲

—Art Jorgensen

### Teaching Math in Secondary Schools Ed Sec 501, Section C1

July 10–21, 8 a.m.–12 noon, Monday–Friday  
Instructor: Sol E. Sigurdson, phone 492-0753

This 3-credit graduate course is open to any mathematics teacher. It focuses on developing teaching-learning activities for meaning, manipulatives, applications, problem solving, and technology for Grades 7–12.

To register, contact Special Sessions, 4-107A Education North, University of Alberta, Edmonton T6G 2G5.

Registration deadline: June 15. A minimum enrollment is required. Students not in a graduate program should register as unclassified students.

# Mathematics Council of The Alberta Teachers' Association

## Outstanding Mathematics Educator Award

### Nomination Form

#### Part 1

Nominee \_\_\_\_\_  
Name \_\_\_\_\_  
Home Address \_\_\_\_\_  
City/Town \_\_\_\_\_ Postal Code \_\_\_\_\_  
Phone Home \_\_\_\_\_ Business \_\_\_\_\_  
Business address \_\_\_\_\_  
City/Town \_\_\_\_\_ Postal Code \_\_\_\_\_  
Signature of nominee \_\_\_\_\_ Date \_\_\_\_\_  
MCATA membership number \_\_\_\_\_ Member since \_\_\_\_\_

#### Part 2

Nominator \_\_\_\_\_  
Home address \_\_\_\_\_  
City/Town \_\_\_\_\_ Postal Code \_\_\_\_\_  
Phone Home \_\_\_\_\_ Business \_\_\_\_\_  
Business address \_\_\_\_\_  
City/Town \_\_\_\_\_ Postal Code \_\_\_\_\_  
Signature of nominator \_\_\_\_\_ Date \_\_\_\_\_

#### Part 3

A minimum of two letters of support. (Please see reverse side for criteria, eligibility and nomination procedure.)

Please forward to      Bob Hart, Chair  
                                 Outstanding Mathematics Educator Selection Committee  
                                 1503 Cavanaugh Place NW  
                                 Calgary, AB T2L 0M8  
                                 Phone 284-3729

Deadline for application: **June 30, 1995**

# **Mathematics Council of The Alberta Teachers' Association**

## **Outstanding Mathematics Educator Award**

This award is conferred in recognition of outstanding contributions in the field of mathematics education and is presented to the recipient at the MCATA Annual Conference.

### **Selection Criteria**

The nominee should

- have demonstrated commitment to improving student learning,
- have contributed to the professional development of teachers of mathematics,
- be creative and innovative, and
- have credibility within the mathematics education community.

Other areas that demonstrate excellence in mathematics education may be considered.

### **Eligibility**

The nominee must be a member of MCATA.

### **Nomination Procedure**

Nominations for the award may be forwarded to the selection committee. A complete nomination application includes

- information about nominee (see Part 1 on the reverse side),
- information about nominator (see Part 2 on the reverse side),
- two letters of support that reflect the above criteria.

For more information, contact      Bob Hart, Chair  
Outstanding Mathematics Educator Selection Committee  
1503 Cavanaugh Place NW  
Calgary, AB T2L 0M8  
Phone 284-3729

Deadline for application: **June 30, 1995**

## From the President's Pen



**T**he MCATA executive met in Edmonton in late February for the annual "Thinkers' Conference"—a full and extremely busy weekend of reflecting and evaluating events of the past year and planning for

the future. The executive is divided into four committees—Conferences, Issues, Membership and Publications. As well as conducting a regular business meeting, the committees worked diligently to set goals and action plans for the coming year.

Thanks to all members who took the time to respond to the "needs" survey. The results were discussed by all four groups. A strong message was received that teachers are interested in information and activities of use to them in their classrooms. With this mandate in mind, the Publications Committee has planned some exciting changes to both content and format of our MCATA publications for the fall. Watch the editor's columns for more details.

Other common concerns of the executive were the need to provide services to members who do not live in the large urban areas and the desirability of increasing membership throughout the province. The possibility of establishing regional councils was discussed at length, and we decided that the formation of regionals will be actively encouraged and promoted next year.

The Conference Committee, in addition to planning the annual conference in Lethbridge in the fall and next year's conference in Red Deer, will assist any group wishing to organize a mini-conference, with the view to possibly forming a regional as well. Details will be sent out to math contact people this spring.

The Membership Committee is sponsoring a joint membership drive with NCTM. Watch

for the new brochures as they arrive at your school. If you're not a member of both MCATA and NCTM, consider the advantages of a dual membership. As an incentive, new and renewing members will receive a \$5 discount coupon that can be used toward purchase of NCTM materials.

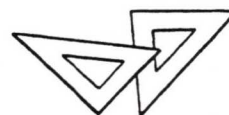
Much discussion took place by the Issues Committee about the results of the needs survey, information regarding regionals and the role of our publications. We decided to establish closer ties with various stakeholder groups and math contact people in the schools to better inform them of MCATA's activities.

Another topic of discussion for the Issues Committee was the organization and duties of the executive and the need for new directors. This newsletter contains information about the upcoming election of table officers. Please consider serving on the executive, either as a director or table officer. If you're interested, contact Past President Bob Hart for more information.

By Sunday afternoon, we were all weary but excited about plans for the coming year, and we left with the feeling that much good work had been accomplished. As always, I close with the reminder that if you have any questions, comments or suggestions, please contact any member of the executive. We are here to serve you. ▲

—Wendy Richards

## The Right Angle



### News from Student Evaluation

#### *January 1995 Mathematics 30 Diploma Examination Results*

**F**or January 1995, 10,420 students had school-awarded marks and diploma examination marks. The provincial results for the school-awarded marks, the diploma examination marks and the final course marks are as follows:

	School-Awarded Mark	Diploma Examination Mark	Final Course Mark
A (80–100%)	26.9	13.1	17.6
B (65–79%)	34.0	24.8	31.6
C (50–64%)	30.7	32.7	36.8
F (0–49%)	8.4	29.4	14.0
Mean	68.7	59.3	64.3
Standard Deviation	14.5	16.6	14.8

School and jurisdiction reports, along with the Examiners' Reports, were distributed to schools at the end of March. If you have any questions, call Florence Glanfield or Lowell Hackman at 427-0010.

## News from Curriculum Standards Branch

### *Math Factor Update*

Math 30 is coming soon to your video screen. *Math Factor*, the math telecourse, is well into production at ACCESS Network. The series will cover the concepts of Math 30 as laid out in the Program of Studies and will incorporate three on-camera teachers, extensive graphics and location footage featuring applied mathematics. Student participation will be included in the studio segments. Teachers may select some or all of the videos as student and teaching resources. *Math Factor* will consist of approximately 60 30-minute videos. The tentative availability date for the production is September 1995. Watch for further information in future newsletters!

### *Western Canada Protocol*

Development of the Western Canada Protocol curriculum for K–12 mathematics is ongoing. Hugh Sanders spoke about this project at many teachers' conventions across Alberta over the last two months. The partners

in the Protocol are B.C., Alberta, the Yukon Territory, the Northwest Territories and Saskatchewan. As more details become available, I'll let you know.

### *Moving*

The Curriculum Standards Branch has moved! It's now located on the 6th Floor East, Devonian Building, 11160 Jasper Avenue NW, Edmonton T5K 0L2; phone 422-3216 (Jack Edwards), 422-3221 (Art Peddicord), 422-3220 (Hugh Sanders), fax 422-3745.

### *Fourth Alberta Mathematics Leaders Symposium*

The Fourth Alberta Mathematics Leaders Symposium will be held at the Calgary Winter Club on Friday, May 5. Topics for discussion are

- directions of curriculum and assessment with emphasis on the Western Canada Framework,
- communicating the expectations of our math program,
- current teacher preparation and mathematics methods emphasis, and
- focused discussion groups.

Phone Art Peddicord (422-3221) or Shirley VanOene (427-2984) for information and registration. ▲

—*Florence Glanfield*  
Alberta Education Representative

# Have Some Fun!

## Krypto Challenge Board

(Two Examples Done)	1, 2, 3, 9, 10		These represent a hand of Krypto
$(10+2+1) - (9+3)$	= 1		= 14
	= 2		= 15
	= 3		= 16
	= 4		= 17
	= 5		= 18
	= 6		= 19
	= 7		= 20
	= 8		= 21
	= 9		= 22
$(2+3) (10+1-9)$	= 10		= 23
	= 11		= 24
	= 12		= 25
1, 2	= 13	Card 35	

## Math Worlds

### A Modular Mathematics Program

*Daiyo Sawada, principal author*

*Pat Redhead, project director*

**P**ublished by Reidmore Books, Edmonton, Math Worlds is a set of thematic teaching units, six to eight weeks long, that can be used to replace or supplement your current Grades 3–6 mathematics materials. We all learn best when what we learn has a direct

connection to something in our lives. Each Math Worlds module enables teachers to create a world where, through a variety of hands-on activities, students can play an active role in learning and practising mathematical concepts. By placing math in a meaningful context, the relevance of learning the concepts is clear, while the cooperative process makes learning fun!

Each module binder contains lesson plans, copy masters, appendices, a problem-solving file, a test-item file and photographs to help “set the scene.”

Special offer: The modules marked with an asterisk have been prepared as kits, in limited quantities. The first 50 people to order each module will receive data booklets, a module

mobile, a Kodak Photo-CD, laminated problem-solving cards and other special items, in addition to the module binder—all for just \$175!

Module Title	Math Concepts
Fire Hall* (Grades 3–4)	<ul style="list-style-type: none"> <li>• problem solving</li> <li>• data management</li> <li>• measurement</li> </ul>
Trading Post* (Grades 3–4)	<ul style="list-style-type: none"> <li>• problem solving</li> <li>• numeration</li> <li>• addition</li> <li>• subtraction</li> </ul>
Collectors' Clubhouse* (Grades 4–5)	<ul style="list-style-type: none"> <li>• problem solving</li> <li>• multiplication</li> <li>• division</li> <li>• data management</li> <li>• fractions</li> </ul>
Factory* (Grades 4–5)	<ul style="list-style-type: none"> <li>• problem solving</li> <li>• multiplication</li> <li>• geometry</li> <li>• division</li> <li>• data management</li> </ul>
Underwater World* (Grades 4–5)	<ul style="list-style-type: none"> <li>• problem solving</li> <li>• fractions, decimals</li> <li>• measurement</li> <li>• data management</li> </ul>
Detective Agency (Grades 5–6)	<ul style="list-style-type: none"> <li>• problem solving</li> <li>• measurement</li> <li>• geometry</li> <li>• data management</li> </ul>
Space Trek (Grades 5–6)	<ul style="list-style-type: none"> <li>• problem solving</li> <li>• numeration</li> <li>• operations</li> <li>• measurement</li> </ul>

Program Kit: \$100

Module Binder: \$175

Note: Watch for additional modules next year! ▲



## NCTM Update

### NCTE Position Statement Endorsed by NCTM

“**L**earning Through Language,” a position statement of the National Council of Teachers of English (NCTE), has been endorsed by NCTM’s Board of Directors. The statement elaborates on the theme “No matter what the subject, the people who read it, write it, and talk it are the ones who learn it best.” Single copies of the position statement are available free on request to NCTE and may be copied without permission. Multiple copies are available at a bulk rate of \$7 (U.S.) per 100, prepaid only. Stock number 04061. Send requests to NCTE Order Department, 1111 W Kenyon Road, Urbana, IL 61801-1096.

### Become a Referee

The vitality of NCTM’s journals depends greatly on the thoughtful comments of referees who consider each manuscript for *Arithmetic Teacher (AT)*, *Mathematics Teaching in the Middle School (MTMS)* and *Mathematics Teacher (MT)*. Referees might expect to evaluate two or three manuscripts each year on topics of their expertise. To volunteer or find out more, write to the journal of choice at 1906 Association Drive, Reston, VA 22091-1593.

### NCTM Mailing List Information

The following statement about NCTM’s mailing list is from the Council’s Service Brochure sent to all new NCTM members:

The NCTM membership list is rented to suppliers, exhibitors, and other organizations that provide product announcements and educational offerings. This keeps members up to date on current technology and products. Members may write the NCTM office to request that their

name be omitted if they desire not to receive information of this kind.

Such a request from a member will also result in the exclusion of that member’s address information from the NCTM Directory of Individual Members and that person will not receive insurance, credit card or other third-party mailings.

### New Communications Handbook Available

*NCTM Communications Handbook* provides valuable information on enhancing communication skills and perfecting mathematics and education-related presentations. Included in the handbook is information on shaping your message, giving an effective speech or presentation, responding to questions from the media, writing letters to the editor and op-ed pieces, and nurturing a relationship with local reporters. Sample press releases and responses are provided. Each AG was sent a complimentary copy of the handbook. Additional copies are available from NCTM for \$7.50 by calling 1-800-235-7566 (orders only). Specify stock number 6505. ▲

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*If at first you don't succeed, relax,  
you are just like the rest of us.*

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## Flaws in Some Mathematics Textbooks

Recently, my Mathematics 33 class wrote a field test. I concluded that a rather unusual notation in the Mathematics 33 text *MathMatters* (Ebos and Morrison 1991) had taken off like a computer virus and spread to the field tests. In the Alberta edition of this text, expressions such as  $y = f(x-4) + 3$  occur. In one section, students are supposed to investigate  $y = cf(x+a) + b$ . To the best of my knowledge, this notation is rather unusual in the mathematical literature. It is quite legitimate to write  $f(x) = x^2 + 3x + 1$  where the  $f(x)$  replaces the  $y$  when we deal with a function. It took mathematicians a long time to agree on the idea of function. I do not think that it is useful to invent parochial notation for pedagogical reasons. Mathematics is, for all the different notations in many of its specialty areas, already difficult enough. We should do everything in our power to keep things simple, especially for Mathematics 33 students. Maybe they should not have to contend with the function notation at all.

While looking through *math is 16* (Ebos and Tuck 1982), I found the following curiosity. The formula for atmospheric pressure is given by the approximate formula  $P = 100(10^{0.054d})$  where  $d$  is the distance in kilometres above sea level. In checking the answers at the back of the book, I found that the pressure rises as a plane or a mountain climber gains altitude. It should be noted that the exponent should be negative. A simple misprint is out of the question because all the answers are incorrect, including the answer in the example. This was at one time an Alberta Education-approved text. Page 199 is dedicated to this material. I preserved the book as a relic!

Other inadequacies may be found in the textbook *Applications of Mathematics* (Price et al. 1990): for Mathematics 14, the authors

decide that 28.7 mm is more accurate than 2.87 cm.

On page 453 of Addison-Wesley's *Mathematics 11* (Kelly, Alexander and Atkinson 1990), we find "Two events A and B are independent if and only if  $P(A \text{ and } B) = P(A) \times P(B)$ ." However, the *if* statement is only valid in one direction. It is important to remember that Kolmogorov (1950) put probability on an axiomatic footing. This type of axiomatization would go far beyond the scope required for high school students. When definitions are given, we should be cautious and do so properly.

Most texts are not written by only one author who can be held responsible. The responsibility lies with provincial departments of education that conjure up separate topics to be taught with little or no relationship to each other.

### References

- Ebos, F., and B. Morrison. *MathMatters*. Book 4. Alberta ed. Scarborough, Ont.: Nelson Canada, 1991.
- Ebos, F., and B. Tuck. *math is 16*. Scarborough, Ont.: Nelson Canada, 1982.
- Kelly, B., B. Alexander and P. Atkinson. *Mathematics 11*. Don Mills, Ont.: Addison-Wesley, 1990.
- Kolmogorov, A.N. *Foundations of the Theory of Probability*. New York: Chelsea, 1950.
- Price, J., et al. *Applications of Mathematics*. Canadian ed. Toronto: Merrill, 1990. ▲

—John G. Heuver  
Grande Prairie Composite High School

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*Despite inflation, a penny for some people's thoughts is still a fair price.*

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# **CMASTE Mathematics Teacher Workshops (Preliminary Draft)**

## **Teaching the New Math 31—Calculus**

*August 23–24*

1. Precalculus mathematics—Peter Schiavoni
2. Intuitive approaches to calculus—Murray Lauber
3. Applications and ideas for teaching calculus—Len Bonifacio
4. Technology—Percy Zalasky

### **Wednesday**

- 8:30 to 11:20—Precalculus, Schiavoni  
11:30 to 12:30—Alta Ed Math 31, Edwards,  
or TI-82  
1:30 to 4:00—Intuitive approaches, Lauber

### **Thursday**

- 8:30 to 11:20—Technology, Zalasky  
11:30 to 12:30—Lesson design for senior  
high, Sol  
1:30 to 4:00—Teaching ideas, Bonifacio

Morning sessions will include a 20-minute coffee break at 10 a.m. Look for registration information in the next issue of the newsletter.

## **Teaching Senior High School Mathematics—Math 10, 13, 20 and 23**

*August 21–24*

1. Teaching with meaning, manipulatives, applications
2. Problem solving as a curriculum goal and a classroom activity
3. Interactive teaching and lesson considerations
4. Specific units—algebra, coordinate geometry, statistics and trigonometry

5. Technology—calculators and computers
6. Assessment practices for senior high school mathematics

### **Workshop Leaders (tentative)**

- Sol Sigurdson
- Wayne Krull
- Percy Zalasky
- Len Bonifacio
- Ralph Mason

## **Teaching Junior High School Mathematics**

*August 21–24*

The focus of the workshop will be on recent developments in junior high school mathematics with special attention to the directions that Alberta Education is considering. More specifically, there will be sessions on the following:

1. Lesson activities with special emphasis on meaning, manipulatives and applications
2. Manipulatives and cooperative learning
3. Problem solving as a curriculum goal and as a classroom activity
4. Designing lessons that include review, mental computation, estimation, seatwork and homework
5. Teaching specific units: algebra, rate and ratio, and fractions
6. Technology—calculators and computers
7. Laboratory activities and materials
8. Assessment practices for junior high schools

### **Workshop Leaders (tentative)**

- Sol Sigurdson
- Ralph Mason
- Katie Pallos-Haden
- Denise Mackeracher
- Roseanne Swan
- Lynn Gordon ▲

# Call for Submissions

The publications director encourages members to submit mathematics-relevant articles for MCATA publications. We certainly would appreciate something from you or a colleague.

## Guidelines for Authors

Mathematics educators and others involved with mathematics education are encouraged to submit articles for possible publication in the Mathematics Council of the Alberta Teachers' Association (MCATA) publications.

Publications include the *delta-K* journal and monographs.

Articles relating to teaching ideas, current issues, trends or concerns, curriculum considerations, research and other issues that impinge on mathematics education are welcome. Each journal has a theme, but other articles are included. Monographs contain articles related to one topic.

Articles are reviewed by the appropriate editor and may be reviewed by the Publications Board that consists of the publications director and editors of the journal and monographs.

## Manuscripts

1. Manuscripts should be typed on 22 cm x 28 cm (8½" x 11") paper, double-spaced and submitted in duplicate.
2. Articles should be no less than 500 words, with the desirable length being 1,500–2,000 words.
3. The preferred style of reference for citations and bibliography is *The Chicago Manual of Style*.

4. Photographs must be black-and-white.
5. Include a short byline about the author(s). Pertinent information may include educational institution, position, degree(s) and granting institution(s), contributions to mathematics education, curricular interests, address and phone number.

## MCATA Publication Policy

The MCATA Publications Board reserves the right to

1. accept manuscripts for publication in either *delta-K*, a monograph or both;
2. revise or ask for a revision. In the event of extensive revision by an editor, the author will receive a copy of the revision. The author will be responsible to authorize the revision;
3. reject a manuscript. In this event, the manuscript will be returned to the author.

## Notes

1. The Alberta Teachers' Association statement, which appears in MCATA publications, states: "Permission to use or reproduce any part of this publication for classroom purposes, except for articles published with permission of the author and noted as 'not for reproduction,' is hereby granted."
2. A copy of the publication will be sent to each author whose manuscript is published. If additional copies are required, notify the editor. ▲

## MCATA Grants

The MCATA executive encourages members to organize professional development activities. The criteria for funding are outlined in the following document.

### Criteria for Awarding Grants for the Mathematics Council of the Alberta Teachers' Association (MCATA) Sponsored Institutes

Grant applications from members of MCATA to a maximum of \$500 must be made in writing to the MCATA conference director.

Grant application must be received by December 1 or May 1, to be considered for the following six-month period.

Grant applications will be approved for mathematics education initiatives which support

- current learning and teaching practices;
- current priorities as outlined by or through Alberta Education, local school districts, MCATA, NCTM, ATA or other reputable educational associations.

The merit of the institute/project will be judged on

- the nature of the project,

- the audience that will participate or benefit,
- diversity in regional development opportunities for teachers.

Grants are to be used for professional development, research directed toward mathematics education or other initiatives which will promote and enhance mathematics education in the province.

Grants are intended to be applied directly to costs incurred in facilitating professional development opportunities. These include defraying the costs of presenters and participants to attend and print materials required to facilitate the professional development. Grants shall not be used for the purchase of equipment and/or capital expenditures or for honoraria.

Special consideration will be given to first-time applicants.

On completion of the institute/project, a written summary must be sent to the MCATA conference director. Successful applicants must be willing to share their results and experiences via *Mathematics Council Newsletter*, mini-conferences and/or annual conferences.

Acknowledgment regarding funding from MCATA executive will be made at the January and June meetings each year. Applicants will be notified of the decision by February 15 (for the December 1 applications) and June 15 (for the May 1 applications).

**Application forms are available from the MCATA conference director. ▲**

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**\$5**

**\$5**

## MCATA/NCTM

Good for \$5 off any publication at the MCATA/NCTM display at the MCATA annual conference in Lethbridge, September 29 and 30, 1995

# MCATA Executive 1994-95

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# Addenda Sampler

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## BORDER PROBLEMS

### Grade 6

**Get ready.** The purpose of this activity is to have students derive written mathematical expressions. Each pair of students will need square grid paper, markers, scissors, and paper and pencil.

**Get going.** Prepare a square (e.g.,  $8 \times 8$ ) with its border colored for emphasis. Lead the students to describe the figure and ask:

*How many unit squares does it have?* [ $8 \times 8$ , or 64]

*How many unit squares are on the border?* [28]

Ask for different written mathematical expressions for describing and determining the number of unit squares on the border.

Some possible expressions follow:

$$\begin{aligned} &8 + 8 + 6 + 6 \\ &(2 \times 8) + (2 \times 6) \\ &7 + 7 + 7 + 7 \\ &4 \times 7 \\ &8 + 7 + 7 + 6 \end{aligned}$$

Have the students cut out a  $9 \times 9$  square and color the border to illustrate how they thought about the squares on the border.

For example, Terry colored the four corners of his  $9 \times 9$  square blue and the four segments between the corners yellow. This is what he wrote down:

$$(4 \times 1) + (4 \times 7) = 32$$

Assign groups of students to explore different figures ( $6 \times 6$ ,  $10 \times 10$ , and so on) and to find expressions to describe the border. Ask them to find numerical expressions for the number of unit squares in the interior of their squares.

*If the number of unit squares in the interior of a square is 81, how many unit squares are there in the square grid? How many are on the boundary?*

*Can the number of unit squares of a given square grid be 40? Why?*

Guide students to find relationships among the number of unit squares in the interior, on the boundary, and in the given square grid.

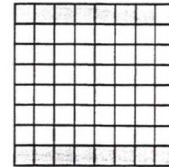
Keep going. Mathematicians sometimes talk about  $n \times n$  squares. What does this mean? Ask,

*How many squares are on the border of an  $n \times n$  square?*

Encourage the students to describe these  $n$ -squares in several ways. Relate their oral descriptions to a variety of written expressions, such as the following:

$$\begin{aligned} &4 + [4 \times (n - 2)] \\ &n + n + (n - 2) + (n - 2) \\ &(n - 1) \times 4 \\ &4 \times n - 4 \end{aligned}$$

Have the class find expressions to describe and determine the number of unit squares in the interior of an  $n \times n$  square once the boundary is known. Help the students with this generalization: In an  $n \times n$  square, there are  $n \times n$  unit squares with  $4 \times (n - 1)$  of these unit squares on the border and  $n \times n - 4 \times (n - 1)$  in the interior. The expression  $(n - 2)(n - 2)$  also describes the number of unit squares in the interior.

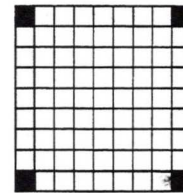


**Many students need to have in hand an  $8 \times 8$  square (with the border colored) as they explore ways of writing mathematical expressions for determining the number of unit squares on its border.**

**Let the students "own" the activity:**

**"What is your rule for the number of squares on the border?"**

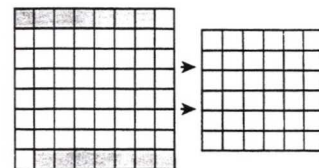
**"Test your rule with some specific examples."**



**Terry's design**

**4 x 7 unit squares on the border**

**$(8 \times 8) - (4 \times 7)$ , or  $6 \times 6$ , unit squares in the interior**



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*Developing Number Sense*, Addenda  
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## **A TASTE TEST: WHICH COLA DO YOU PREFER?**

**EXPERIMENT:** Do students as a class have a definite preference for a certain brand of cola?

**EQUIPMENT:** Three liters of different colas, preferably in plastic bottles, and small paper cups

**PROCEDURE:** Remove the labels from each of the colas and mark one bottle X, another Y, and the third Z. Students should mark the side of their cups X, Y, Z. (If the number of students taking part in the experiment is divisible by 3, the computation will be simplified. If necessary, students can solicit tasters from another class.) To randomize the order of testing, groups of students should taste in various orders, such as X, Y, Z; X, Z, Y; Y, X, Z; and so on. Three pourers should pour a small amount of soda into the appropriate cup for each student. The students should not taste the soda until all the cups are full and should vote only for a single preference.

Tally the results of the class votes on the activity sheet, which can be found on page 60 of *Data Analysis and Statistics*, the 9-12 Addenda Series book. After all votes are in, calculate the chi square. The expected results would indicate there was no real preference, and the votes were random. For example, if there were twenty-four students tasting the colas, each cola would have eight votes.

To provide a standard to use for comparison, use a fair die to simulate the random tasting. Let faces 1 and 2 be brand X, faces 3 and 4 be brand Y, and faces 5 and 6 be brand Z. Roll the die once for each student who tasted the cola and record the face (letter). Complete the table for the random votes and calculate the chi square. Record each student's random chi square on the stem-and-leaf distribution. The table may need to be extended if students generate large chi squares. (In order to get a large enough sample of chi squares, some students may need to calculate several random chi squares.) Have students locate the chi square from the cola test on the distribution and calculate the probability that a chi square is greater than or equal to this number. Their conclusion should be based on their interpretation of this probability and what they perceive as being a "significant" chance.

Students may raise a variety of considerations. Do plastic bottles change the taste of the colas? Does the temperature of the soda influence the taste? Does the amount of soda tasted make a difference? These are valid concerns and might affect any real decision based on the results. Have students recommend which brand of cola the school soda machine should stock and why. As a final step, try to identify the brands of soda.

As an extension, identify several places where the chi square test might be used. Consider areas such as testing, jury selection, or science. A biology teacher might have some real applications from class experimentation.

The computer program found on page 59 of *Data Analysis and Statistics* (9-12 Addenda Series) can be used to calculate the chi square for  $n$  outcomes of an experiment.



**ANNUAL  
CONFERENCE  
of the  
MATHEMATICS  
COUNCIL**

**of  
THE ALBERTA  
TEACHERS  
ASSOCIATION**

**SEPT. 29 & 30, 1995**

**EL RANCHO  
TRAVELODGE  
and  
LETHBRIDGE  
COLLEGIATE  
INSTITUTE**

**LETHBRIDGE,  
ALBERTA**

★ Small and large sessions  
for all divisions

★ Sharing successful  
strategies

★ Social events

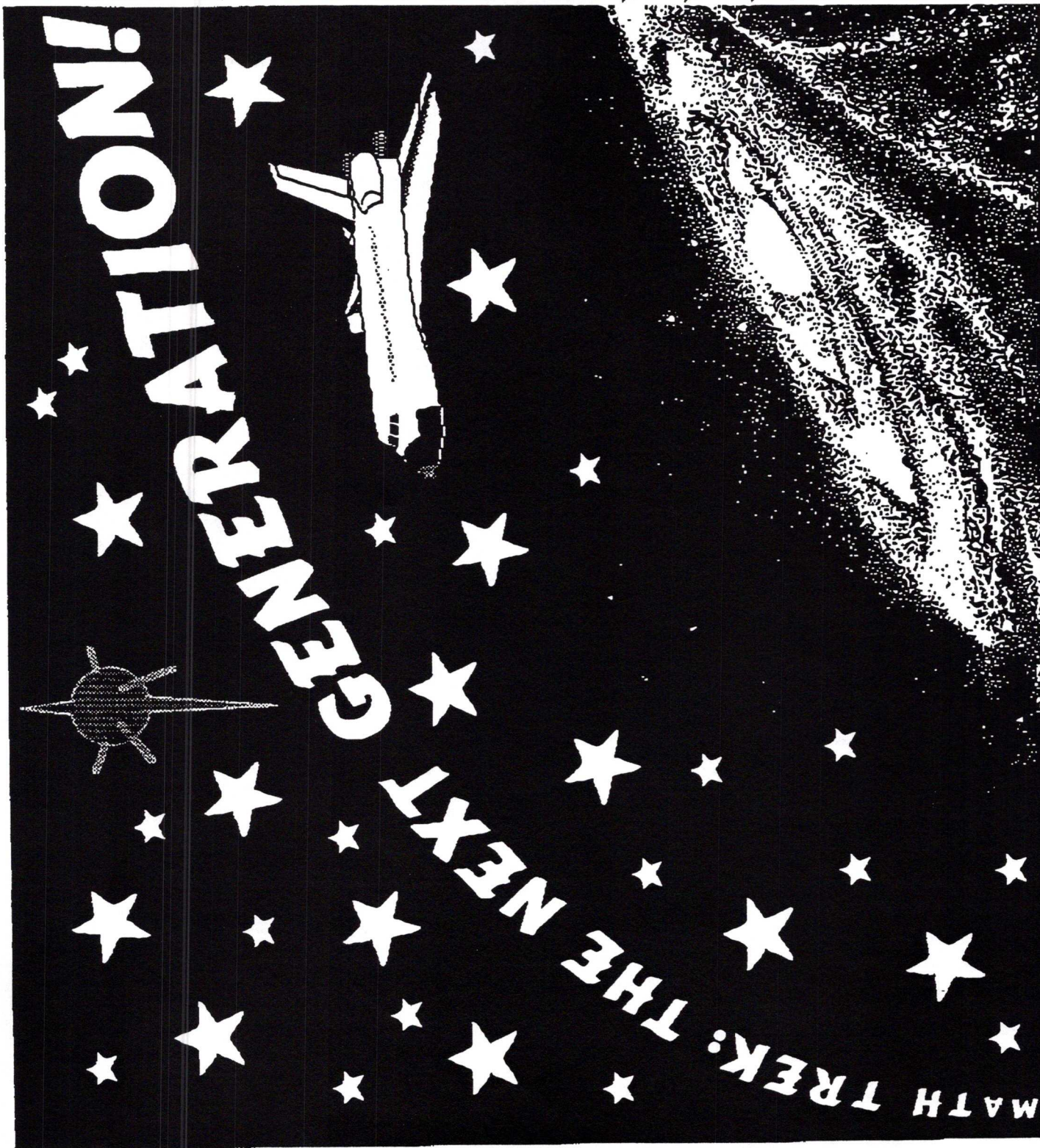
**-REGISTRATION-  
Before June 29, 1995**

**\$90 MCATA Members**

**\$120 Non-MCATA  
Members**

**\$30 Students**

**\$60 Saturday Only  
(GST to be added)**



## Program

Thursday Evening, September 28, *El Rancho Travelodge*

- Pre-Registration: 7:00 - 9:00 pm

Friday Morning, September 29, *El Rancho Travelodge*

- Registration: 8:00 - 9:00 am
- Division Specific Sessions for all Levels

Friday Afternoon, September 29, *Leth. Collegiate Institute*

- Exhibits
- Workshops & Small Sessions

Friday Evening, September 29, *El Rancho Travelodge*

- Keynote Speaker: Dr. Robert Thirsk, Canadian Astronaut
- Galaxy Gulp Wine & Cheese (cash bar & door prizes)
- Cosmic Comedy

Saturday Morning, September 30, *Leth. Collegiate Institute*

- Exhibits
- Workshops & Small Sessions

Saturday Afternoon, September 30, *Leth. Collegiate Institute*

- Exhibits
- Sharing Successful Strategies (win a door prize!)

## Exhibits

Various displays of the newest instructional and resource materials.

## Accommodation Information

The following hotels are within walking distances of conference sites:

- **El Rancho Travelodge**, 526 Mayor Magrath Drive  
Phone: 1-800-578-7878

1 Queen Bed — \$41.75 + Tax  
2 Queen Beds — \$49.75 + Tax  
Suite — \$54.95 + Tax

\* add \$5.00 for each additional person.

- **Sandman Inn**, 421 Mayor Magrath Drive  
Phone: 1-800-Sandman

Single or Double — \$55.75 + Tax

- **Super 8 Lodge**, 2210 - 7 Avenue South  
Phone: 1-800-800-8000

1 Queen Bed — \$45.00 + Tax  
2 Queen Beds — \$55.00 + Tax

Registrants are responsible for making own arrangements for accommodation. Please ask for MCATA rate when booking.

Please detach and mail to:

Linda McKenzie  
2212 - 27 Avenue South  
Lethbridge, Alberta  
T1K 6K3  
(403) 327-3465 work phone  
(403) 327-1300 home phone



### Please check:

<input type="checkbox"/> MCATA Member Registration	\$90.00 + GST = \$96.30	_____
<input type="checkbox"/> Non-Member Registration (includes membership)	\$120.00 + GST = \$128.40	_____
<input type="checkbox"/> Student Registration	\$30.00 + GST = \$32.10	_____
<input type="checkbox"/> Saturday Only Registration	\$60.00 + GST = \$64.20	_____
Cancellation Fee: \$20.00	After June 29th add \$10.70	_____

Name \_\_\_\_\_

Address \_\_\_\_\_ Postal Code \_\_\_\_\_

School \_\_\_\_\_

Phone \_\_\_\_\_ (home) \_\_\_\_\_ (school)

Make cheques payable to: MCATA '95 Conference

# Nominations for MCATA Executive Positions

Nominations for the following offices for the 1995–96 school year are now being accepted:

- President
- Vice-President (two positions)
- Secretary
- Treasurer

To nominate a candidate, complete the form below and mail it to Bob Hart, 1503 Cavanaugh Place NW, Calgary T2L 0M8. **Nomination deadline is May 12, 1995.**

If an election is necessary, it will be conducted by mail. Ballots will be sent to all members on or about May 25, 1995.

Ensure an active council by nominating people who will take an active part in making the Mathematics Council benefit all mathematics teachers.

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## MCATA Executive Nomination Form

We, the undersigned members of the MCATA, nominate \_\_\_\_\_  
as a candidate for the office of \_\_\_\_\_ in MCATA for the year 1995–96.

Signatures and addresses of two nominators

Name \_\_\_\_\_ Address \_\_\_\_\_

\_\_\_\_\_ MCATA Membership Number \_\_\_\_\_

Name \_\_\_\_\_ Address \_\_\_\_\_

\_\_\_\_\_ MCATA Membership Number \_\_\_\_\_

Include a brief resume of the nominee's qualifications for the position on the reverse side of this sheet.

I accept this nomination \_\_\_\_\_  
(signature of nominee)

Home Address \_\_\_\_\_ Phone Number \_\_\_\_\_

Work Address \_\_\_\_\_ Phone Number \_\_\_\_\_

MCATA Membership Number \_\_\_\_\_