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Mathematics Council NEWSLETTER

The Alberta Teachers' Association

Volume 5

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Are We Qualified?

Are we, the mathematics teachers of Alberta, qualified? There appears to be some doubt. The BC Association of Teachers of Mathematics reported in 1984 that BC did not require its math teachers to take any academic courses in mathematics. An article in a 1985 issue of Alberta Report claimed that there is a chronic shortage of qualified math teachers in Alberta.

A survey, recently completed for the Mathematics Council of The Alberta Teachers' Association by Tom Schroeder and Louise Frame, suggests that there is reason to be concerned. Over 40 percent of the secondary math teachers surveyed have less than a minor in mathematics. Approximately one-third have never studied calculus, statistics, or linear algebra. Over one-third have never taken a course on the methods of teaching mathematics. The vast majority have never studied computer languages or the educational use of computers.

Of teachers at the elementary level, nearly two-thirds have never taken a mathematics course at university, and over one-quarter have not taken a mathematics methods course.

In addition to this, many mathematics teachers appear to be doing little to maintain or upgrade their qualifications. Only about one in 10 has attended even a single inservice activity related to mathematics in the last three years. Also, the vast majority are not members of any related professional organization such as the National Council of Teachers of Mathematics (NCTM), the Mathematics Council of The Alberta Teachers' Association (MCATA), or The Alberta Teachers' Association Computer Council (ATACC).

Many of the findings of the report should be of concern to the membership of MCATA. Surely, as a professional association, we have an obligation to act on this issue. Perhaps during the current period of teacher surpluses, it is time to press our provincial government to establish and enforce a minimum qualification for mathematics teachers.

- Francis Somerville

Call for Action

The final report of Thomas Schroeder and Louise Frame's survey of Alberta mathematics teachers, "The Preparation and Continuing Education of Mathematics Teachers in Alberta: A Status Survey and Needs Assessment," has been distributed to all MCATA members. Now MCATA must consider what actions need to be taken to address the issues raised in the report.

Reactions are invited from all interested individuals. MCATA plans to publish a collection of papers recommending specific actions. Colleagues who wish to participate are asked to send contributions before March 15, 1987, to:

Thomas Schroeder
Curriculum and Instruction Department
Faculty of Education
University of Calgary
Calgary, Alberta
T2N 1N4.

Alberta High School Prize Exam

The Alberta high school prize exam is written each year in late October. Students in Grades 10, 11, and 12 are eligible to write this multiple-choice mathematics exam. The main purposes of the exam are to identify mathematics talent and to select students to write the scholarship exam in February. This year's scholarship exam was just written on February 10, so names of winners are not yet available.

The top 10 Alberta students will advance to the Canadian Mathematics Olympiad. The top six Canadians will attend the international Olympiad, which will be held in Havana this year.

The exam committee sends information to all Alberta high schools early in September. If further information is required at this time, contact:

Dr. F.A. Barager
Department of Mathematics
University of Alberta
Edmonton, Alberta
T6G 2G1.

—Junior High School Mathematics Program—

A new junior high school mathematics program will soon be available to Alberta schools. Revisions to the current program are well on their way with teachers from across Alberta involved in the process. A draft statement of the program of studies that constitutes the legal prescription for the mathematics program has been mailed to every Alberta school in which Grade 7, 8, or 9 mathematics is taught. Teachers have been invited to respond to this draft.

A list of new learning resources should be announced in the spring of 1987. Optional implementation is scheduled for September 1987, and mandatory implementation will follow for Grades 7, 8, and 9 in September 1988. A draft of the new curriculum guide will be available for field testing in September 1987.

The revised program is a 100-hour course with required and elective components. The required component comprises 80 percent of the program while the elective component, which will be used to meet individual student needs and capabilities, comprises 20 percent of the program. In cases in which the time allotted to the mathematics program exceeds the 100-hour minimal requirement, additional content that enhances the understanding of the required component may be presented to all students.

The revisions to the current program do not change its content as much as they change the emphases on various aspects of the program. The changes are summarized below:

Problem Solving Problem solving is the unifying goal of the revised program. The traditional view of problem solving (routine applications of computation and algorithmic approaches) has been replaced with a multi-strategy approach that uses process as a tool in working toward a solution in situations in which neither the solution nor the means to the solution is known.

Number Systems and Operations Increased, substantial emphasis is being placed on the use of concrete materials to help students understand operations. Limits have been placed on paper-and-pencil computations while emphasis on mental computation, estimation, use of calculators, and drill with basic facts has been increased.

Ration and Proportion The emphasis on using concrete manipulatives and on application has increased.

Data Management The current emphasis on interpreting graphs has been replaced with an emphasis on collecting, recording, and reporting data. Elementary notions of statistics and probability will be introduced.

Algebra The revised program emphasizes the application of algebraic concepts. Content that overlaps with the senior high mathematics program (for example, polynomial algebra) has been deleted from the Grade 9 program.

Measurement and Geometry These topics have been consolidated into one strand in the revised program. The concepts of capacity and mass have been added to the content, and the emphasis on measurement at a concrete level has increased.

Technology Like problem solving, the use of technology, especially calculators and microcomputers, has been integrated into all the strands of the revised program. The use of calculators and microcomputers will be explicitly described in the appropriate objectives of the program and in the curriculum guide.

If you have any questions or concerns about the new program, please share them with Merv Lastiwka, Junior High Mathematics, Alberta Education. He can be reached by telephoning 427-2984 or by writing to:

Box 17
11160 Jasper Avenue
Edmonton, Alberta
T5K 0L2.

Circle these dates on your calendar!

OCTOBER						
S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

MCATA '87

October 22 - 24, 1987

Marlborough Inn

Calgary, Alberta

Conference Chairman - George Ditto

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Computers in the Classroom

At the National Council of Teachers of Mathematics (NCTM) conference held in Edmonton last October, Father Stanley Bezuska suggested some interesting problems from number theory. He related instances of his students' using computers to find interesting solutions. A few of his problems are printed below. If you or your students have an interesting solution, please send it to:

The Editor, Mathematics Council Newsletter,
9548 Oakland Way SW,
Calgary, Alberta
T2V 4G5.

1. Perfect Numbers

A positive integer N is perfect if N is the sum of its factors other than itself. There are only 4 perfect numbers less than 10,000. An example of a larger perfect number is:

191561942608236107294793378084303638130993721548169216¹

What are the 4 perfect numbers less than 10,000?

2. Ulam Numbers

- a. Take a positive integer N
- b. If N is odd, do $(3N + 1)/2$
- c. If N is even, do $N/2$
- d. Repeat steps b and c on the result

What numbers end in 1? These are Ulam numbers. More important, how many steps does it take to get to 1?

3. Wondrous Numbers (an adaption of Ulam numbers)

1. Take a positive integer N
2. If N is odd, do $(3N + 1)$
3. If N is even, do $N/2$
4. Repeat steps 2 and 3 on the result

What numbers end in 1? Note that the number of steps to reach 1 is even more startling than in the case of Ulam numbers.

A not-very-interesting solution to number 1 follows. Note the use of the percent sign after the variables. This is important in number theory questions as it causes the computer to store the results as integers rather than real numbers. The program should work on an Apple or IBM.

¹Underwood Dudley, Elementary Number Theory (New York: W.H. Freeman & Co., 1969), p. 58.

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10 PRINT "TEST FOR PERFECT NUMBERS"  
20 INPUT "WHAT IS YOUR NUMBER";N%  
30 FOR I = 1 to N% / 2  
40 IF N% / I = INT(N% / I) THEN S% = S% + I  
50 NEXT I  
60 IF S% = N% THEN PRINT "PERFECT"
```

Introducing Mary-Jo Maas



Mary-Jo Maas is a very visible person. Around her home town of Fort Macleod, Alberta, she is often seen riding her motorcycle, singing in the church choir, or camping with her husband, Peter. She even tends to boast a little when talking about her six-month-old daughter, Susan.

Mary-Jo is also very visible when it comes to mathematics education. She is well known around Alberta for her workshops that have been conducted in Lethbridge, Fort McMurray, Grande Prairie, and Airdrie. She has a strong interest in using groups in the classroom for solving problems and facilitating the use of manipulatives. She has served on numerous committees including the Math Curriculum Coordinating Committee of Alberta Education.

Mary-Jo has also been visible on the Mathematics Council of The Alberta Teachers' Association (MCATA) where her involvement extends back to 1971. She has served as the secretary for the past five years. She has also served as the secretary of the Southwest Regional of MCATA. In addition, she has presented workshops at MCATA conferences and has acted as a presider for sessions.

Mary-Jo has taught in Fort Macleod, Taber, and Lethbridge and on the Blood Indian Reserve near Cardston. She has experience as a classroom teacher, a subject specialist, and a resource room coordinator. During the 1985-86 school year, she was seconded to the University of Lethbridge to teach mathematics methods courses and supervise student teachers.

MCATA Executive Election

Nominations of candidates for the following offices for the 1987-88 school year are now being solicited:

President	Secretary
Vice-President	Treasurer

If you wish to nominate a candidate, please complete the form below and mail by May 1, 1987, to: Gary Hill, 310 Laval Blvd., Lethbridge, Alberta T1K 3W5.

If necessary, the election will be conducted by mail. Ballots will be sent to all members on or about May 15, 1987.

Ensure an active council by nominating people who will be active and make the MCATA beneficial to all mathematics teachers.

This form may be duplicated if additional nomination forms are required.

Gary Hill
for the Election Committee, MCATA

Nomination Form

WE, the undersigned members of the Mathematics Council of The Alberta Teachers' Association (MCATA), nominate _____
(name)

of _____
(address)

as a candidate for the office of _____ on the MCATA for
(office)
the year 1987-88.

Signatures and addresses of two nominators:

Name _____ Address _____

Name _____ Address _____

(Please include a brief resume of the nominee's qualifications for the position.)

I accept this nomination: _____
(signature of nominee)