

Mathematics Council NEWSLETTER

The Alberta Teachers' Association

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Homework: Yes or No?

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FEB 27 1985

EDITOR'S NOTE: The question of the impact of homework on mathematics achievement is one that has raged for years. Likely, mathematics texts are the ones that are carted home most frequently. The following article on this topic might prove of interest.

* * * * *

Several of the national reports on educational improvement issued in 1983 suggested that children should be given homework on a regular basis. Is there evidence that homework in mathematics promotes pupils' achievement?

- Yes, some studies indicate that mathematics achievement is higher when homework is given than when it is not.
- Almost the same number of studies indicate that achievement is not affected when homework is given.
- No studies have shown that homework has a negative effect on mathematics achievement.

Thus, assigning homework may be useful, since it may increase achievement but won't decrease it.

According to a review of the research by Austin (1979), homework may be most beneficial for improving computational skills. Another review by Marshall (1983) suggests that it is more beneficial for improving problem-solving achievement. If homework is usually assigned to provide practice on the lesson taught in the classroom, then it should reflect ongoing curricular concerns. This practice seems particularly important in view of Pressman's (1980) finding that homework constitutes a significant portion of a student's total "opportunity to learn."

Driscoll (1980) suggests that short daily assignments appear to be the optimal form of practice. Long-term retention is better served if assignments on a given topic are spread out over time rather than concentrated in a short interval. The amount of practice required should vary from student to student, so pains should be taken to individualize practice as much as possible. The activities chosen should be ones that allow students a good chance for achieving success. However, "more of the same" shouldn't be assigned after a child has clearly mastered a particular skill.

Some further points are added by Austin (1979) as a result of his review:

- The effects of homework may be cumulative.
- Parental involvement alone does not ensure the effectiveness of homework.
- Making comments on homework papers can result in higher achievement than when comments are not made.

Historically, perceptions of whether homework should be given have vacillated in 15- to 20-year cycles. In recent years, few schools have required homework; however, we are now reaching, once again, the point in the cycle where homework is touted as a way of raising standards. It may do more than that - it may help to improve mathematical achievement.

Math Magic

Three Given Numbers

Put down three numbers, each less than 10. Multiply the first by two, add five, and multiply by five. Add the second number, and multiply the sum by 10. Add the third number. Subtract 250. The result will be the three numbers.

Age and Amount of Change

Ask a friend to multiply his age by two. Now add five. Multiply by 50. Subtract the number of days in a year. Add the amount of change in his pocket that is less than a dollar. Add 115. Ask him to give you his result. The first two digits will indicate his age; the second two digits will indicate the amount of change.

Obtaining Five

Take a number. Add 14. Multiply by two. Subtract eight. Divide by four. Subtract one-half the original number. Your answer will be five.

Write and You Will Receive

Many companies are now providing free or inexpensive computer-related materials in an effort to promote sales or their own corporate images, and teachers would be well advised to take advantage of these efforts. For information about free films, write to the following:

Modern Talking Pictures

5000 Park Street North, St. Petersburg, FL 33709 - 9989

This company offers free loan of films to schools. Although most titles are suited for adults and high school students, the film *About Computers (IBM)*, #11914, a cartoon explaining how computers work and their most common applications, is suitable for upper elementary, middle, or junior high school students.

Several foresighted educational groups are providing teachers with a tremendous computer resource; they are collecting software produced by teachers and distributing it either free or at very low cost. For current details about this software, write to the following:

Softswap, San Mateo County Office of Education

333 Main Street, Redwood City, CA 94063

Send an original program as a contribution, and pick any disk from their expanding collection. Disks can be purchased, but swapping is encouraged. Programs are available for the Apple, TRS-80, IBM, PET, Atari, and TRS-80 Color Computer.

Young People's Logo Association

1208 Hillsdale Drive, Richardson, TX 75081

Send an original program as a contribution, and pick any disk from their expanding collection. More than 250 disks can be purchased, but swapping is encouraged. Special emphasis is placed on Logo. Disks are available for the Apple, PET, T1, Atari, and TRS-80 Color Computer.

Will You Be There?

1985 MCATA CONFERENCE

to be held in Lethbridge
on October 25 through 27, 1985

1986 NAME OF SITE CONFERENCE

to be held in Edmonton
on October 17 through 19, 1986

MCATA Recognizes Outstanding Math Educator

by Bob Michie
Vice-President, MCATA

During the 1984 Annual Conference, the Outstanding Mathematics Educator Award was presented to Marshall Bye. Marshall is married and has two children. Since 1949, he has been active in education as a teacher, vice-principal, principal, mathematics department head, mathematics consultant, and mathematics supervisor.

Marshall Bye received the Shell Merit Fellowship to Stanford University in 1962 and the National Science Foundation Award to Wayne State University in 1965-67. He has been active in the ATA in various positions and held the office of president of the Mathematics Council, ATA, in 1966-67. He has spoken at various NCTM conferences and has presented several papers internationally, including a paper presented at the Second International Congress on Mathematical Education in Exeter, England. These are only a few of the highlights in Marshall's career.

Listed below are some of the comments that others have made about Marshall:

- He has influenced the direction of math curriculum in Alberta. He sat on, or was available for consultation with, many committees that were determining the direction of math curriculum in Alberta.
- His opinions were sought and respected.
- He could make you immediately feel at ease when you sat down to discuss any topic with him.
- He always insisted on involving teachers in projects, and he always sought the opinions of as many teachers as possible.
- He was there - he was there for teachers to consult; he was there when change occurred in Alberta math education.

I have personally had the opportunity to work with Marshall since 1966. Education has three major components - students, teachers, and curriculum. I have no doubt that Marshall influenced students immensely in his early career, though I didn't see this because it was before my time. However, I have seen him influence students through teachers and curriculum.

Marshall has been a driving force behind at least four provincial projects that had an effect on curriculum in Alberta:

- MAMP - Media and Math Project
- Junior High Math Project
- CML - Q-Math Project
- ACLIC - Assessing Cognitive Levels in Curriculum

Marshall's involvement in all of these emphasizes and demonstrates his ideas on how children learn mathematics. He has also influenced curriculum and teachers through his writing with Holt, Rinehart and Winston.

In my opinion, Marshall's greatest contribution to mathematics education has been through his work with teachers in Alberta. In the opening session of the conference, Dr. Susan Theiren spoke of the teacher of the future as a "mentor-guide." I have had, and I know many other teachers have had, a "mentor-guide" in Marshall Bye. He is always willing to share his exceptional insight into the integration of curriculum, learning theory, and the classroom experience. Marshall is totally respected and trusted by the teachers with whom he has worked.

Best Problem Contest

- (a) A nasty number is a positive integer with at least four different factors such that the difference of one factor pair equals the sum of another factor pair.

6	is nasty because	$2 + 3 =$	$6 - 1$
24	is nasty because	$4 + 6 =$	$12 - 2$
30	is nasty because	$3 + 10 =$	$15 - 2$

Find the other six nasty numbers less than 180. You may wish to write a computer program to conduct this search.

- (b) There are three men named Tom, Dick, and Harry. Each of the men is engaged in two occupations. The occupations are bootlegger, musician, painter, chauffeur, barber, and gardener. From the following list of facts about the three men, see if you can find the two occupations of each man.

1. The painter bought a quart of spirits from the bootlegger.
2. The chauffeur offended the musician by laughing at his moustache.
3. The chauffeur courted the painter's sister.
4. Both the musician and the gardener used to go hunting with Tom.
5. Harry beat both Dick and the painter at checkers.
6. Dick owed the gardener some money.

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Mathematics Teachers: Where Are They?

As one reads, or talks with educators across Canada and the U.S., it becomes evident that there exists a critical shortage of teachers who are specifically trained to teach children mathematics. This shortage exists not only at the secondary level, but also at the primary and elementary levels.

Many teachers of primary and elementary mathematics have had only one mathematics course beyond high school, and this may not necessarily be a mathematics methods course.

It is frequently assumed that because teachers may have a basic knowledge of the content of mathematics courses at the primary and elementary level, they also have the skills for teaching it. However, nothing can be farther from the truth. It is during these years that children develop life-long attitudes toward mathematics learning. If they have enjoyable and productive experiences, they will develop a positive attitude toward mathematics and themselves. Unfortunately, what often occurs is that children are exposed to mathematics in an abstract form long before they are ready for it, and as a result, never develop a real understanding of the concepts. They then develop negative attitudes toward mathematics and themselves.

To be successful, children should be taught mathematics as a living, vibrant, participatory activity. For this to become a reality, it is going to become necessary for all teachers who are planning to teach children mathematics to have more extensive training in effective mathematics teaching skills during their university programs.

For many practising teachers who recognize the inadequacies of their mathematics methods, it is imperative that there be a readily available extensive in-service program for upgrading. This situation has been recognized in the United States. For example, the University of Santa Clara in California has conducted an innovative far-reaching program to upgrade mathematics teaching skills of selected teachers from 11 districts in the immediate area. Participating teachers receive release time for intensive classroom training and for the observation of master teachers.

How long will it be before the need for such a program is recognized in Alberta and steps are made to meet it?

Review of Secondary Programs

MCATA has been asked to make a submission with regard to the report *Review of Secondary Programs* prepared by the minister's advisory committee. We would like to hear your reaction. Please send your comments to Louise Frame, 411 Rundlehill Way NE, Calgary T1Y 2V1, by February 28, 1985.

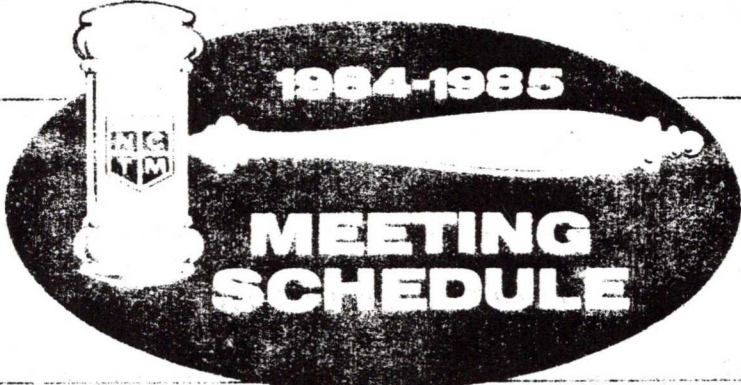
Did You Know?

How Large Is a Million?

Did you know that a million seconds are equal to 11.6 days, that a million minutes are equal to 1.9 years, that a million inches are equal to 15.7 miles, and that a million feet are equal to 189.4 miles? Did you know that a million pennies would make a stack almost a mile high, that a million one-dollar bills would weigh over 2,000 pounds, and that a million dollars would buy 50 homes costing \$20,000 each?

How Many Ways Can a Dollar Be Changed?


Did you know that it is possible to change a dollar 292 different ways using all Canadian coins (pennies, nickels, dimes, quarters, and half-dollars)? There are 40 combinations without the pennies, 40 without the nickels, 74 without the dimes, 158 without the quarters, and 242 without the half-dollars.



1984-1985
MEETING SCHEDULE

63d ANNUAL MEETING • San Antonio, Texas • 17-20 April 1985

SAN DIEGO CONFERENCE San Diego, California 31 January-2 February 1985	Microcomputer Seminars Philadelphia, Pennsylvania 16-18 January 1985
CEDAR RAPIDS CONFERENCE Cedar Rapids, Iowa 14-16 February 1985	New Orleans, Louisiana 27 February-1 March 1985
YAKIMA CONFERENCE Yakima, Washington 14-16 March 1985	San Francisco, California 27-29 March 1985
PARSIPPANY CONFERENCE ParsIPPany, New Jersey 21-23 March 1985	Denver, Colorado 8-10 May 1985



A regional listing of "Professional Dates" is yours free for the asking from the NCTM. Complete program booklets for NCTM conventions, conferences, and seminars are available on request three months before each meeting.

NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS, 1906 Association Drive, Reston, VA 22091

Magic Squares

Albrecht Dürer (1471-1528) was a famous German artist. He lived during the Renaissance and was one of the first to use the geometry of perspective in his work. His etching titled *Melancholia* contains the 4 X 4 magic square exactly as shown here. Notice how cleverly he incorporated the date 1514.

The numbers in every row, column, and diagonal of a magic square have the same magic sum.

16	3	2	13
5	10	11	8
9	6	7	12
4	15	14	1

1. What is the magic sum for this magic square?
2. How many rows, columns, and diagonals can you find with this magic sum?
3. Find five 2 X 2 squares in the magic square with four numbers that have the same sum as the magic sum.
4. Now try to find four numbers, each from a different row and column, that also have the same sum as the magic sum. There are two solutions besides the two diagonals.

Do It! Write Now!

Do you have submissions for the *Newsletter*?
All contributions will be greatly appreciated.

SOLUTIONS TO BEST PROBLEM CONTEST (from page 5):

- (a) 54, 60, 84, 96, 120, and 150.
- (b) Tom - painter and baker; Dick - bootlegger and musician; Harry - gardener and chauffeur.