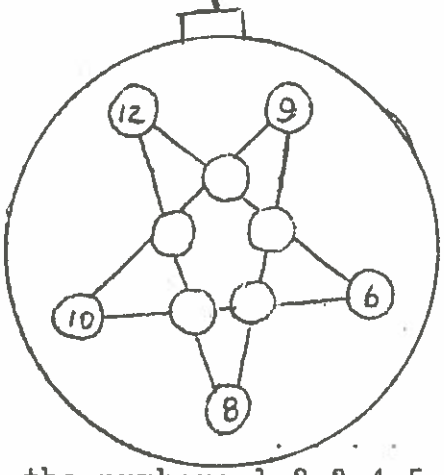
ABACUS

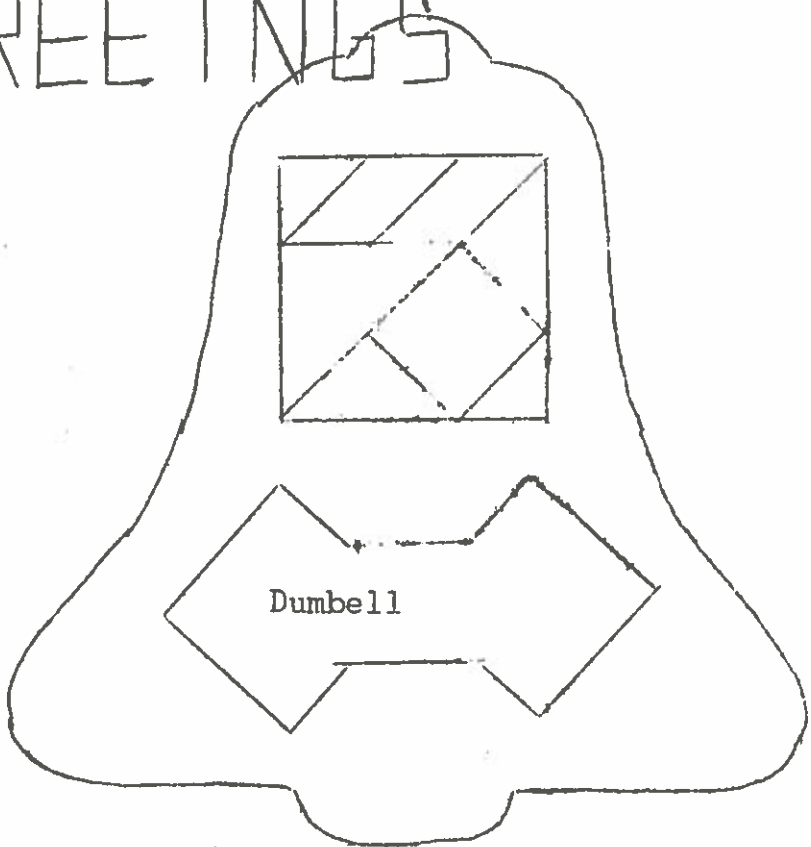
A PUBLICATION OF THE
ONTARIO ASSOCIATION for MATHEMATICS EDUCATION

Volume 4 Number 2 November 1976

SEASON'S GREETINGS



Place the numbers 1,2,3,4,5 in the circles so that each row of four circles has the same sum.



You'll be a real Dumbo if you can't discover how this Dumbell is made from the eight pieces of this Tangram.

YOUR MEMBERSHIP IN OAME INCLUDES THE ABACUS YOU CAN COUNT ON IT!

WRITE TO THE SECRETARY TREASURER

1976-77 EXECUTIVE

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London, Ont. N6K 2X4

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Editor: Andy Czempinski, P.O. Box 614, Iroquois Falls, Ontario, P0K1E0

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From the Editor:

For a variety of reasons, this edition of "Abacus" has been delayed, thus my apologies to all. Hopefully you had a good summer (it seems to be so far away ... at least in Northern Ontario), and now you are in the full swing of 1976-77, ... and are aware of the anticipated changes which recognize that all students must be at least exposed to some mathematics instruction at the high school level. It is worthwhile to note that OAME has been in favour of this policy, thus I would assume that all mathematics educators welcome the proposed changes.

In this edition of "Abacus" you will find some articles from the distant provinces such as Alberta and British Columbia and some from our southern neighbours. Hopefully you will find these articles interesting, useful, and timely.

At this time all members of OAME should have their Certificates of Membership and be displaying them in prominent places.

The next edition of "Abacus" will be out in mid-November. Have a good year, abolish mathophobia, and mathematize with joy.

Andy

THE TWO GIRLS SELLING CANDY BARS

Two girls were selling candy bars for their respective school clubs. Each had thirty candy bars to sell. The first girl sold her bars for fifty cents each; the second sold her bars three for a dollar. At the end of the day their total receipts were $15.00 and $10.00, respectively, or a total of $25.00.

The next day the girls decided to pool their same number of candy bars and sell them at five for two dollars. At the end of the day, upon counting their total receipts for the candy bars, they found they had only $24.00. They searched all about for the other dollar, each thinking the other had it.

Actually, both of the girls were very honest. Neither of them was holding out. But, if this is true, what happened to the "missing" dollar? Can you explain?

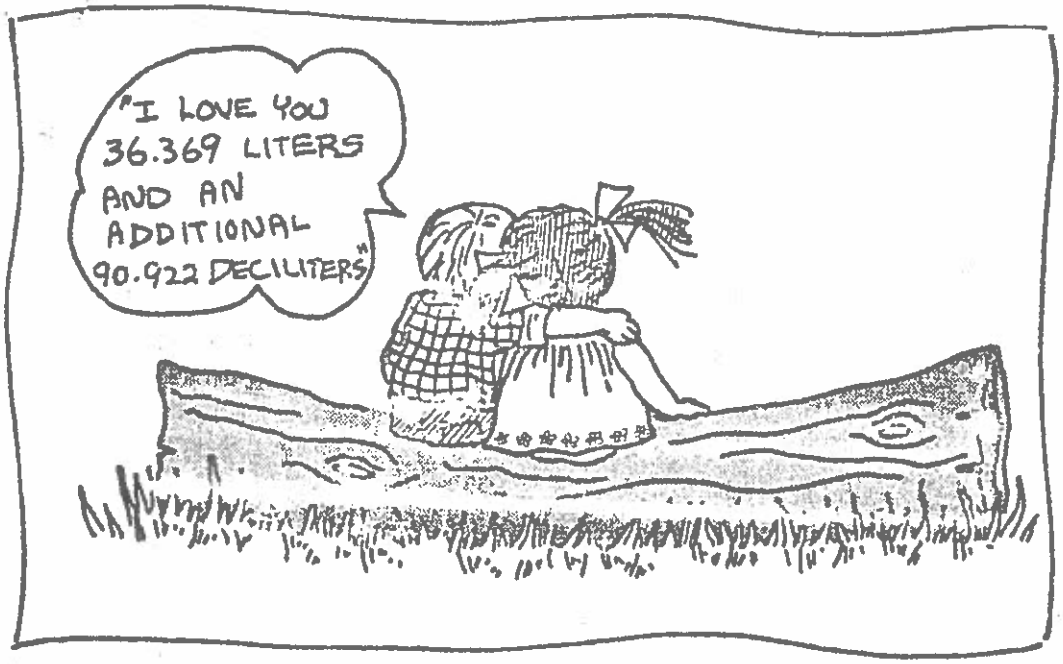
DID YOU KNOW . . .

. . . "Metric Measurement Activity Cards" is a publication of the Michigan Council of Mathematics. These cards may be obtained for $2.00 prepaid from: H. L. Mourer, MCTM Publications Chairman, 2165 East Maple Road, Birmingham, Michigan 48008.

. . . that Metric Place Mat samples can be obtained from Springprint Company, Springfield, Ohio. Ask for design No. 436, an excellent simple presentation of metric units.

. . . GMC has available a pamphlet entitled "The Swing to Metric" which deals with the background, growth, principles, and impact of the metric system, and its applications within GM. Write to General Motors Corporation, Personnel Communication Dept., Detroit, Michigan 48202.

. . . that Anders Celsius (1701 - 1744) originally described his temperature scale to read 100° in melting ice and 0° in boiling water. This development was presented to the Swedish Academy of Science in 1742. Six years after his death, the scale was inverted to read as it presently does.



(Reprinted from Delta-K, the Alberta Teachers' Association Mathematics Council, Volume XIV, No. 3, February, 1975.)

. . . that the Metric System simply and logically coordinates the measurements of length, area, volume, and mass (or weight) into one DECIMALIZED system.

. . . that there are basically three principles that a system of weights and measures should include.

1. A standard unit of measure based on some absolute standard which is easily reproducible.
2. The basic units of length, volume, and mass should be interrelated.
3. The system should be based on the decimal system.

Our English system has only the first principle, while the Metric System has all three.

* * * * * * * * * * * * * * * * *

Mind Stretchers

1. Evaluate

$$\frac{1}{1+\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} + \ldots + \frac{1}{\sqrt{1975}+\sqrt{1976}}$$

2. Solve

$$(x + y)(x + y + z) = 72$$
$$(y + z)(x + y + z) = 120$$
$$(z + x)(x + y + z) = 96$$

DID THE INDIANS GET GYPPED?

The Indians are said to have sold Manhattan Island to the Dutch in 1626 A.D. for goods having a value of approximately $24. If the Indians had invested this amount of money wisely, do you think they could afford to buy Manhattan Island back today?

If the Indians had placed their money with a conservative trust organization offering seven per cent interest compounded annually, they might well be able to buy Manhattan Island back at its current value. The $24 would have increased to $24 x 1.07, or $25.68, the first year; to $25.68 x 1.07, or $27.48, the second year; and so on. By the year 1975, the principal and interest would amount to over two hundred billion dollars, or about twice the estimated value of Manhattan Island.

STATEMENT ON MATHEMATICS

More is known to have been discovered in the last fifty years about mathematics than in the previous two thousand years. The knowledge about mathematics is so vast that our great mathematicians specialize in but a small segment of this knowledge area.

4

Basics ... Basics ...

As the debate on basics goes on, the readers of "Abacus" may be interested in the article from "Delta-K", Vol. XVI, No. 1, September, 1976, a publication of The Alberta Teachers' Association Mathematics Council.

Basics in Junior High

by *Bernie Biedron*

Are basics the major emphasis in junior high school mathematics programs today? How well do your junior high students know their basics? How competent are your junior high students with their computations? These are only some of the questions which have rarely been seriously asked in the past ten years in the field of junior high mathematics. I believe it is time that we as junior high school mathematics teachers and for that matter, as mathematics teachers in general, seriously ask ourselves this question, for I believe that the basics are not the major emphasis in junior high school mathematics programs today and they definitely should be. Before proceeding any further, I will define the term basics. As far as I am concerned, basics refers to the basic elementary operations of addition, subtraction, multiplication, and division of whole numbers, fractions, and decimals.

The opinions expressed in this article are based not only upon scientific research but also upon personal experience. I have been teaching junior high school mathematics for the past seven years and I have also taught grades five and six mathematics for a period of four years. I really became concerned and preoccupied with this idea of basics approximately three years ago when I discovered, during the early portion of the school year, that several of my grade seven students had never mastered their three times multiplication table facts. Ever since I have come to believe that, in general, junior high school mathematics students do not know their basics. Stop for one moment and think of any one particular class that you teach and see if you can honestly answer 'no' to each of the following questions. Do any of your students construct mini-multiplication tables and attach them into their mathematics notebooks in inconspicuous places? Do any of your students hesitate, for some time, when they are asked to answer very simple addition or subtraction questions? Do any of your students use fingers to facilitate computation? Now, I could go on and on, but if the answer is 'yes' to any one of these questions, then your mathematics students do not know their basics. Students should learn to become so habituated to the basic elementary operations with numbers that they do not have to think about them. I believe that teachers should do all they can to make the basic elementary operations so habitual that students do not have to think about them any more than they think when they turn on the colour television set.

What is the problem? Why don't students know their basics? Two very good questions. Ever since the '60s, when the new mathematics was first introduced everyone closely involved with mathematics and especially teachers have been overemphasizing such concepts as set theory, groups and fields, combinations, permutations, bases, etc. At the expense of the basics, and let's face it, it is much easier to teach bases than it is to teach the multiplication facts irregardless of the method employed. Secondly, I believe that the mathematical game approach has gone too far. Mathematical games are an asset to any good junior high mathematics program, but they have their place and I say let's keep them there. Dr. Max Beberman, one of the founders of the new mathematics and quite active in it for some twenty years, claims that the students of the new mathematics cannot perform the elementary operations as well as those who were subject to traditional drill. In an article in the 1971 issue of *Mathematics Teaching*, Professor Beberman repediated the entire new mathematics curriculum and was determined to pursue a totally new approach. Professor Edward G. Begle, director of the School Mathematics Study Group (SMSG) admitted that the SMSG curriculum has indeed minimized the acquisiton of the basics.

Dr. Morris Kline, professor of mathematics at New York University, claims that the new mathematics has hurt the teaching of mathematics instead of improving it mainly due to the fact that students do not have a good understanding of the basics. Closer to home, professors of pure and applied mathematics at the University of Manitoba are seriously considering the implementation of a package of basics into the first year mathematics courses. All this means only one thing to me, and that is our students do not know their basics.

What is the solution? What can be done to ensure that basics are the major emphasis in junior high school mathematics programs? Let's begin right here in Manitoba. I believe that we urgently need a master curriculum with the basics and options for each particular grade level K-12 built in, therefore comprising of one complete package. The organization of the master curriculum should involve representatives from every facet of the mathematics education field. This would include, of course, representatives from the Department of Education, universities, community colleges, high schools, junior high schools, and so on. Every school division within the province could then take the master curriculum and adapt it to suit the various needs of that particular school division continuously emphasizing the basics and implementing some of the options as necessary. This would provide for consistency in the teaching of the required basics and it would also provide for uniformity as far as students' standards are concerned. This would also mean that any one school division could virtually administer its own tests on the basic skills and thereby pinpoint the students' weaknesses. Furthermore, the province could also administer a standardized test in order to determine where the students are at as far as the basics are concerned.

I am convinced that a student cannot in any way come to possess a good understanding of the abstract concepts in mathematics -- and I mean any field in mathematics -- unless he or she has the basics at his or her fingertips.

I am also of the opinion that junior high school students should be required to learn the basics in one way or another for there is no future ahead for them if they know only one third or one half of the basics necessary in the high school program. As far as I am concerned, basics were the major emphasis of junior high mathematics, and for that matter mathematics in general, prior to the '60s when the new mathematics was introduced, and were intended to be the major emphasis according to those responsible for initiating the wave of the new mathematics, and always will be the major emphasis in mathematics regardless of the

approach. Yes, basics should be the major emphasis in the junior high school mathematics program and also in any mathematics program at any level for that matter. Incidently, basics are the major emphasis at our school.

Paper presented as part of course work in 81.501, the Teaching of Secondary Mathematics, under the supervision of Professor Murray McPherson.

Reprinted from The Manitoba Mathematics Teacher, Vol. 4, No: 3, April

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TANGRAMS

By Dennis Hamaguchi, W,L, Seaton School, Vernon

Fellow Mathgents:

Our superiors have requested a 'mission impossible' to save our country Geometrica from the invaders of Goo Gol Lee. Our people have a hint of the coming danger - a shattered clay tablet was discovered near the capital. Our task is to piece the tablet back to its original shape to avert the danger. This message will not, I repeat, will not, self-destruct in any number of seconds. Good Luck!

Plan:

1. Construct a 15 centimetre square.. Label it ABCD.
2. Draw the diagonal AC.
3. By construction, determine the midpoint of AB, (call it T); and the midpoint of BC, (call it U). Join TU.
4. By construction, determine the midpoint of TU. Call it V. Join DV.

   OUR MISSION IS ALMOST COMPLETED.

5. Label the intersection of DV and AC, W.
6. By construction, determine the midpoint of AW (call it X). Join XT.
7. By construction, determine the midpoint of CW (call it Y). Join VY.
8. Cut out your seven pieces. Each shape is called a tangram.
9. See how many shapes you can make with all seven pieces. Each time you make a tangram, draw an outline of the shape.

7

Calculators Are Here to Stay

by *Gilbert Raineault*
Guyot School in
St. Boniface

The winds of change are blowing in education, sweeping away time-honored practices and replacing them with new and puzzling developments. One of these changes is still on the horizon, and its impact is still to be felt. The hand-held calculator, a novelty only two or three years ago, will soon be making inroads into the mathematics curriculum. It is now the subject of frequent articles in the daily newspapers. National news magazines and professional reviews are also following the adoption of this tool by our society and are reporting these developments to their readers.

Conditions now exist that seem to virtually assure the introduction of the calculator in the schools. First of all, the price of these machines is coming down because of mass production. Only three or four years ago, the price of a basic model was about two hundred dollars; similar models now retail for thirty or forty dollars. Some models are available for approximately twenty dollars, and rumors have it that ten-dollar units will be on the market in two or three years. Calculators will be no more expensive than good dictionaries, thus bringing them into almost universal distribution. The use of calculators is also becoming widespread in industry, and more importantly for students, in the home.

What implication does this have upon the teaching of mathematics at the junior and senior high levels? Many teachers are justifiably concerned with the prospect of seeing their students using calculators at school. They fear that the computational skills acquired at the elementary level will be forgotten, and that the students will develop a dependency on these machines, and will gradually be unable to function in mathematics without them. Indeed, putting calculators into the hands of students who have an incomplete mastery of the fundamentals of arithmetic would bring on disastrous consequences.

In spite of these reservations, the use of these machines by students will become fairly commonplace in a very short period of time. Their widespread use outside the school will almost necessitate their being accepted in the classroom. Their advent will necessitate certain changes in the mathematics curriculum. There will have to be some shift of emphasis in both subject matter and skill development to accommodate calculators. These changes will probably involve the following areas:

(1) Computational skills will still be taught, as these are absolutely essential. There will be less need, however, for the tedium of repetitious drill. Less emphasis will be placed on algorithmic computation.

(2) The basic facts of arithmetic, such as the multiplication tables, will still have to be known in order to permit the students to be able to estimate the results of the calculations done with the calculator.

(3) The students will have to master thoroughly the skills of rounding off and of finding significant digits. They will also have to know how to use these rounded figures in their calculations.

(4) A firm grasp of the concept of place value will be essential if students are to understand and make sense of the answers they will obtain from a calculator.

(5) Fractions will have a somewhat decreased importance in the curriculum, as these will be changed into their decimal equivalents for use in the calculator. Decimal numerals will also be more in use with the gradual introduction of the metric system.

(6) Teachers can anticipate some changes in the textbooks as authors and publishers will soon be taking into consideration the impact that calculators are having on the teaching of mathematics. It is to be hoped that they will get away from the artificial or "made-up" problems all too prevalent in textbooks today, where all divisions come out even and where all fractions cancel out nicely.

(7) Creative teachers will soon see the opportunity for students to solve mathematics problems using calculators in subject areas other than mathematics, thus enriching the entire curriculum. The use of calculators will permit this without loading down the students with the drudgery of endless calculations.

The introduction of calculators in the classroom will not constitute a "revolution" in mathematics education. The novelty will soon wear off, and students will soon see it as just another learning tool, much like the cassette recorder or the typewriter. However, they will have at their disposal a machine that will permit them to perform complex calculations at a great speed and with a minimum of inaccuracies. The students will soon become aware of these benefits.

The calculator will never be a panacea for all of the ills of mathematics education. Indeed, it could only add to those ills if it is used unwisely. To begin with, it has no place at the elementary school level, where students should be acquiring a solid background in the basic mathematics skills. Also, it should never be placed in the hands of a student who doesn't have a firm grip of the basic concepts and processes of mathematics. This would be detrimental to learning. However, it will liberate good students from the tedium of repetitious computations and will permit them to focus on the real importance of problem solving.

Rightly or wrongly, change in education often occurs very slowly and schools find themselves all too often behind the times. The acceptance by teachers of such a commonplace article as the ballpoint pen is a case in point. They permitted its use in schools only after it had overwhelmingly replaced the fountain pen and the quill in our society. Similarly, the calculator is not a passing fad; it is here to stay. Its use will very soon be widespread in all sectors of society. It will soon find its way in schools. Teachers will have to cope with this new development.

Provincial departments of education will have to come to the aid of these teachers. Research will have to be done to determine the impact of calculators on the mathematics curriculum. Recommendations concerning the implementation, the use, and the evaluation of the use of calculators will have to be formulated. The precautions to take while using calculators will have to be clearly stated. Teacher education programs will have to be organized. It is to be hoped that this will be available to teachers when the need is felt.

References

[1]Judd, Wallace P., "A New Case for the Calculator", *Learning, The Magazine For Creative Teaching*, March 1975, pp.41-48.

[2]Berger, Ivan, "Calculators Get Smaller, Smarter and Cheaper", *Popular Mechanics*, December 1974, pp.70-75.

Paper presented as part of Course Work in 81.501 the Teaching of Secondary Math., under supervision of Professor Murray McPherson.

Reprinted from The Manitoba Mathematics Teacher, *Volume IV, Number 2, January, 1976.*

LARGE NUMBER

What is the largest number you can indicate with three digits? If you think it is 999, you're wrong! Nine raised to the ninety-ninth power is also wrong. The correct answer is nine raised to the ninth power of nine. Here's what the number looks like:

$$9^{[(9)^9]} \quad \text{or} \quad 9^{(387,420,489)}$$

If this number was written as an ordinary whole number, it would contain over 350 million digits. Allowing ten digits to the inch, such as might be done on a typewriter, it would require a piece of paper over five hundred miles long to write the number on a single line.

THE CANADIAN AND AMERICAN DOLLARS

This incident could happen. It could happen, that is, if the governments of the United States and Canada had foreign exchange difficulties.

Let us say that the Canadian government decreed that a United States dollar was worth only 90¢ in Canadian money; at the same time the United States government decreed that a Canadian dollar was worth only 90¢ in United States money.

A boy, living in a town that was part in Canada and part in the United States, decided to buy a candy bar. He had a Canadian dollar, so he went to the Canadian part of town to make his purchase. Upon buying a ten-cent candy bar he was given a United States dollar, worth 90¢, for change. He then came to the United States part of town and bought a second ten-cent candy bar, whereupon he was given a Canadian dollar, worth 90¢, for change. Thus, the young man had two ten-cent candy bars and his original dollar.

Who paid for the candy bars?



Ontario MATHEMATICS DEPARTMENT - C. A. Manahan '76

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DUMAS, ENOCH. Math Activities for Child Involvement. Boston: Allyn and Bacon, Inc., 1971.

"A book of 458 projects, materials, games, puzzles, riddles and resource items to draw from as you involve children in their own learning."

3-92: pp. 124-5: Fibonacci series. Each number after the first two is the sum of the two preceding numbers: 3, 2, 5, 7, 12, 19, 31, 50, 81, 131,... (The sum of 10 Fibonacci numbers in series is 11 times the 7th number.)

3-93: pp. 125-6: Palindromic numbers. Start with any number and add to it the number obtained by reversing the digits. In many cases the sum will read the same from either end. 142 + 241 = 383. If it does not, the digits of the sum may be reversed and added to the sum. Repeat until you get a "PAL" number. Count the number of additions you had to make and classify the number as 1-step, 2-step, etc. Try each of these: 257; 185; 69; 280; and 97.

4-32: pp. 172-3: Finger multiplying to find the products using factors 6, 7, 8, or 9. e.g. 6 X 8 = *
Think: 8 is 3 more than 5 (bend down 3 fingers on the left hand. Think: 6 is 1 more than 5 (bend down 1 finger on the right hand. The sum of the "bent down" fingers tells the tens digit (3 + 1 = 4); and the product of the unbent fingers on each hand (2 X 4 = 8) tells the ones digit. *= 48.

7-27: pp. 249-50: Calendar problem. (See May issue of The Arithmetic Teacher for C. E. Niemann's "discovery.)
What day of the week were you born? Three tables must be used. It helps if you can memorize the Month table:

J	F	M	A	M	J	J	A	S	O	N	D	*Leap year 1 less for
1*	4*	4	0	2	5	0	3	6	1	4	6	Jan. & Feb. ONLY.

The Century table is used to find a day in history otherwise for 1900-2000 use "0". 1800 to 1900 use "2"; in 1752 a calendar change occurred and 11 days "disappeared". Sept. 14,1752 to 1800 use "4", 1700 to Sept. 2, 1752 use "1". 1600 to 1700 use "2".

Finally, convert your answer, as follows:-
Sun.- 1; Mon.- 2; Tue.- 3; Wed.- 4; Thu.- 5; Fri.- 6; Sat.- 0.

Ex. May 18, 1945. What day?

Add: Century # plus last two digits of the year plus 1/4 of two digits (disregard any remainder) plus the special month # plus the day-date then divide by 7 and note the remainder and look up the "day" table. Sun. etc.
Ex. 0 + '45 + 11 (1/4 of 45) + 2 (MAY) + 18(th) = 76.
76 ÷ 7 = 10 (forget this and note the remainder = 6, a FRIDAY!)
Try your own birthday. May 18, 1945 was a FRIDAY.

ONTARIO TEACHER EDUCATION COLLEGE - 951 Carlaw Avenue, TORONTO M4K 3M2
Charles A. Manahan - Mathematics Department

MULTIPLICATION X 9

It's easy and it's fun because it is so close to X 10.
Let's review X 10 (use concrete material or money, if necessary). Notice that six tens (6 X 10) says its own name sixTY. So does seven tens (7 X 10) - sevenTY, where TY is a slurred, fast way of saying tens. Not all words are as "structured" as sixTY, sevenTY, nineTY. EighTY loses a letter. So does fourTY. FifTY substitutes f for ve. ThirTY uses some of the letters of three tens and twenTY is almost like twinTY, but don't spell it THAT way!
So much for the TENS.

Now make an array (like a rectangle of chocolates, or eggs) of the X 9 (and we'll read the rows across).

x x x x x x x x x °← This row of nine x's is 1 less than 10
x x x x x x x x x ° Two rows of 9 x's = 2 less than 20
x x x x x x x x x ° Three nines = 3 less than 30
x x x x x x x x x °
x x x x x x x x x °
x x x x x x x x x °
x x x x x x x x x °
x x x x x x x x x °
x x x x x x x x x °

(The little ° is to help you think of a row of ten. You could make a cardboard chart and cover the ° each time).

That's the same as saying:

1 X 9 = 1 X (10 - 1) = 10 - 1 = 9
2 X 9 = 2 X (10 - 1) = 20 - 2 = 18
3 X 9 = 3 X (10 - 1) = 30 - 3 = 27

Finish this story, and notice that you always take away as many ones as you have _____.

Then there is the JOKE from our most eastern Province. Or maybe we should talk about the fellow from Erehwon (that's No where, spelled backwards) who applied for a job and his test was to write out the X 9 table.

He began: 1 X 9 = 9
2 X 9 = that's one I don't know, and wrote 1
3 X 9 = that's two I don't know, and wrote 2
and so he continued until he reached
4
5
6
7
8
9
... 10 X 9 = 90 (which he remembered, so he wrote 90).

He felt quite unhappy because he thought he would fail the test, and therefore, would not get the job. See page 2.

So he thought he would try again, this time from the bottom. He looked at 9 X 9 and said, that's one I don't know, and he wrote 1 beside the number that was already there.

And so he continued, up the table:

8 X 9 that's two I don't know, until he reached the top. (As you tell the story, fill in the numbers, using one color of chalk for the numbers down, and another color - for the numbers up.

He was quite unhappy when he handed in the test paper, but quite overjoyed when the examiner told him he had answered every part correctly.

Let's look at his test paper and see some interesting things:-

1 X 9 = 09
2 X 9 = 18
3 X 9 = 27
4 X 9 = 36
5 X 9 = 45
6 X 9 = 54
7 X 9 = 63
8 X 9 = 72
9 X 9 = 81
10 X 9 = 90

the ones descend: 9, 8, 7, 6, 5, ...

a) the digits of each answer (the product) add up to NINE. 1 + 8 = 9; 2 + 7 = 9, etc.

b) the numbers in the tens column ascend: (0), 1, 2, 3, 4, ... while the numbers in the ones descend: 9, 8, 7, 6, 5, ...

c) each number (product) has a reverse:- 18, 81: 27, 72; look for other pairs.

What is the sum of each pair of numbers?

Divide your class (group) into two parts. The TENS, and the ONES. As you say, 6 X 9,- the TENS ANSWER - fifty (it couldn't be 60!) and the ones, say, very quickly a number that goes with the 5 (of fifty) to make (add up to) a 9. They yell (whisper!) 4 - so that the whole answer comes out FIFTY-FOUR. Try 3 X 9 = . Tens and ones, REVERSE. Then have two pupils pair off as tens/ones. Try other things.

You can find the answers by adding: 9 + 9 = 18. 18 + 9 = 27, etc. It's easy to add 9. Just add 10 to the number and take away 1 from the answer. Or, first take away 1 from the number, and then add 10. Try 38 + 9. 38 + 10 = 48. 48 - 1 = 47. So: 38 + 9 = 47. OR - 38 - 1 = 37. 37 + 10 = 47. So: 38 + 9 = 47.

Finally: for those studying OTHER BASES. You might be interested to know that all of the things that work in our own base ten system with the X 9 table, work in other bases if you try one less than that BASE. For instance: in base seven, try X 6 or in base five, try X 4.

BASE SEVEN (I am leaving out the little "subscript")		BASE FIVE
cont'd from right.	1 X 6 = 06	1 X 4 = 04
2 X 6 = 33	2 X 6 = 15	2 X 4 = 13
3 X 6 = 42	3 X 6 = 24	3 X 4 = 22
4 X 6 = 51	see left etc.	4 X 4 = 31
10, X 6 = 60		10, X 4 = 40

Chu '76

YOUR ASSISTANCE IS REQUIRED

At the Annual Meeting of OAME in Ottawa in May, 1977 we shall elect the following: 1 President-elect, 3 Executive Members (Directors), about 10 Councillors. If you would like to fill one of these positions or wish to nominate someone else please copy the following.

I nominate ..... (name)

.....(professional Address)

for the position of .....:(president-elect , director, councillor)

Name of Nominator .....

Professional address .....

NOTE: 1. This nomination should be accompanied by information supporting the nomination.
2. A summary of the qualifications of those members who are allowing their names to stand in nomination will be published with the March Gazette.
2. Return to: Mrs. Joan Routledge,
Box 194, Aurora, Ont.
L4G 3H3



THE ABACUS
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N7T 4E9

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247 Lee Drive,
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