ABACUS

A PUBLICATION OF THE
ONTARIO ASSOCIATION for MATHEMATICS EDUCATION

OAME

Vol. 2 Number 1 DECEMBER 1973

Seasons Greetings



$$36$$
$$4 \times 9$$
$$2 \times 2 \times 9$$
$$2 \times 2 \times 3 \times 3$$
$$1 \times 2 \times 2 \times 3 \times 3$$



I met a girl last year
Her age I can't remember
But the digits reversed
Were thrice the first.

How old is she?

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

WRITE TO THE SECRETARY TREASURER

Twin Lakes →

OAME: Kingston in 1974, London in 1975

1973 - 74 EXECUTIVE

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GREETINGS AND COMMENTS FROM THE EXECUTIVE AND OAME COUNCIL

The president and executive extend warmest season's greetings to all OAME members.

A working paper related to the Intermediate Division Cyclic review was discussed at the November Council meeting. All mathematics teachers will be interested to note that among the recommendations included in this presentation was the following: Mathematics should be taught as a distinct discipline. Its applications and inter-relationships with other studies should be stressed but mathematical concepts and skills should be studied as such.

The 1-4 November NCTM Toronto meeting hosted by OAME at the Royal York Hotel was very successful. Thanks to the efforts of the Committees all went smoothly. Enthusiastic comments were heard about sessions throughout the whole conference and all were delighted with the Friday evening address by Prof. R.E.K. Rourke. Approximately 1500 math teachers from California to P.E.I. were in attendance.

The ranks of OAME are swelling. Many new memberships were issued at the NCTM meeting and M. MacGregor is receiving all new applications.

FROM THE EDITOR

Thanks are due to those who are submitting items for the abacus. If your item does not appear in this issue we can look forward to it at a later date.

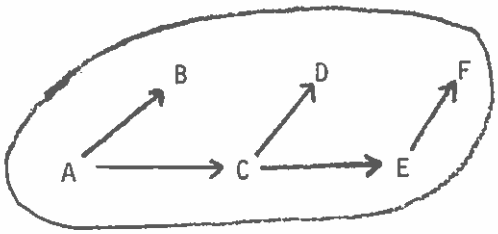
SEND YOUR MATH GAME, puzzles, class activities, book reviews, ideas to:

The ABACUS EDITOR
c/o CITY MATH CENTRE
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If "$\longrightarrow$" is read: "_____ is a daughter of _____" (all such arrows being shown) i.e. "A$\longrightarrow$C" is read "A is a daughter of C". How is D related to A?



LOGIC PUZZLE

Five men and five women formed a club in college and they all married within the club. The men were: Jim Thompson, Bob Smith, Bill Jones, Tom Williams, and Harry Brown. The girls were Mary, June, Jane, Helen, and Sally. After marriage, they settled in Seattle, Atlanta, Boston, San Diego, and Detroit. Can you find out which woman married which man and where each couple settled?

1. Mary told Bill's wife that while she and her husband were touring the eastern states, they visited the Browns.
2. Mrs. Williams told June that she thought Mary and her husband expected to stop in Detroit to pick up a new car on their way home from the East.
3. The Smiths lead a quiet life. They haven't been outside of California since their marriage.
4. Mary and Mrs. Smith were the first two women to marry. They had been very fond of June in college. They were sorry she didn't marry Bill.
5. Sally hadn't seen Mrs. Jones since college, and she seldom heard from the Williamses except at Christmas.
6. Even though Helen lived on the east coast, she did not see Mary and her husband since their tour only took them as far north as Pennsylvania. Helen told Bill's wife she was very disappointed that she did not see Mary.

LAST ISSUE'S PUZZLE !

Solution: ØWN $\neq$ 987 and SØWS = 3(ØWN) $\neq$ 2961

$\therefore$ S < 3 consider S=2, then 3(N) must end in 2 making N = 4
now 3(W) + 1 must end in W, impossible (just try W=0,1,...9)

$\therefore$ S = 1 now N = 7 as only 3(7) ends in 1
3(W) + 2 must end in W which is true for W = 4 or 9
consider W = 4, then 3Ø + 1 must end in Ø, impossible as above

$\therefore$ W = 9 now 3 (Ø) + 2 must end in Ø which is true for Ø = 4 or 9
but 9 is too large

$\therefore$ O = 4 $\therefore$ SØWS + 1 = 1491 + 1 = 1492



Norman Miller of Kingston, Ontario, sends the following, which was quoted by the late Prof. N.F. Dupuis in his astronomy class.

The purpose of the rhyme is to obtain the day of the week on which any given date (e.g. 16 November) in the current year falls. On the line of the rhyme "the first" refers to New Year's Day and the one thing you must remember is the day of the week of New Year's or the preceding Christmas Day. You can then use the rhyme to find the day of the week on which any given date occurs.

The first of October you'll find if you try,
The second of April as well as July,
The third of September and also December,
The fourth day of June and no other, remember,
The fifth of the leap month, of March and November,
The sixth day of August and seventh of May,
Agree with the first in the name of the day,
Only do not forget that when leap year is reckoned,
From the first of March on they agree with the second.

concluded from page 7

teaching of computer studies. Resource personnel from business, other boards of education, universities, community colleges and faculties of education will play an important role. The establishing of such a committee will in all likelihood require financial backing in order to be effective.

Computer studies by definition implies a close relationship with industry. We feel that a more efficient liaison should exist between computer studies teachers and businessmen. The Computer Studies Committee outlined above should be the vehicle for establishing this liaison.

Business IS willing to cooperate. As an example, we refer to the London chapter of the Association for Systems Management. John Harkness, president of this chapter, outlined at the workshop a scheme by which a "skills list" is being compiled. This list will contain the names of persons who are skilled in a given area and who are willing to be engaged as speakers to various groups, including teachers. We see Mr. Harkness' efforts as a step toward developing this important relationship.

These thoughts were a product of our attendance at the INFORMATICS Workshop in June 1973. An INFORMATICS IMPLEMENTED Workshop has been proposed for 1974. Will you be there?

James W. Burns - Secretary NOMA
Jeff Gadsden - Teacher Computer Studies, Shelburne, Ontario

NOTE: NCTM 52nd Annual Meeting, Atlantic City, April 1974

HOW TO USE AN ABACUS FOR DIVISION
A CHINESE TRICK!

E. Evans

An interesting method to use an abacus for division was shown me by a Chinese bookkeeper. (I do not know whether it is generally used by Chinese.)

For example: to divide 645 by 83, he estimated the answer about 7, then added 17, seven times to the 645 giving a total of 764 $645 + 17 \times 7 = 764$

$$\therefore \quad \frac{645}{83} = 7\,\frac{64}{83}$$

The theory for this is that if $(N + r)$ is divided by x where N's a multiple of x (a 2-digit number), and r is the remainder, then by adding $(100 - x)$ n times, he gets n in the 100's column.

$$(N + r) + n\,(100 - x) = 100\,n + r$$

When $n = \frac{N}{x}$, this is an identity.

$$\boxed{(N + r) + \frac{N}{x}\,(100 - x) = 100\,\frac{N}{x} + r}$$

If x is a 1- or 3-digit number, use 10 or 1000 instead of 100.

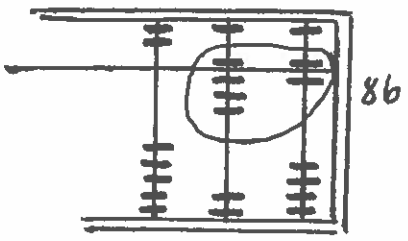
The method is to add n times until the number n appears in the 100 column (or 10 or 1000 column, if x is a 1- or 3-digit number).

A simple example, to divide 14, 21, 28 or 63 by 7 add 8's until the units column is empty! Thus $\left(\frac{56}{7}\right)$ can be found by adding 3's to the 56 until you reach 80 and the answer is 8 with no remainder.

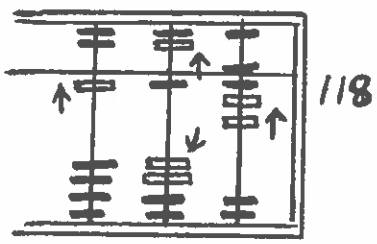
In order to shorten the work, as in the first example, instead of adding 17 seven times, he might add 34 + 68 + 17

In adding 17, he might add 20 - 3 or 10 + 7 or 15 + 2 whichever was most convenient.

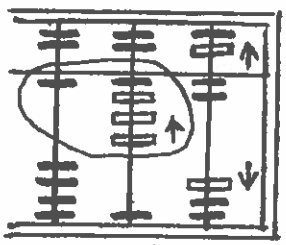
For example, in dividing 86 by 6, he could first add 8 x 4 or 32 at once, and then add 4's until 14 appears with the 14th 4.



86

+ 

32
or 100 - 70 + 2

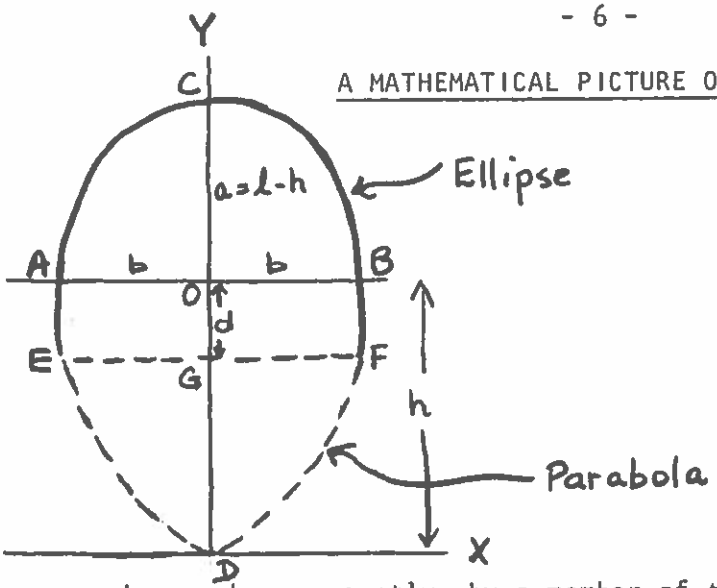
+ 

24
by adding 5 - 1 or 10 - 6 or 4, six times (or 30 - 6 at once)

$$\therefore \quad \frac{86}{6} = 14\,\frac{2}{6}$$

The Japanese abacus has only one row of 5's instead of two. Actually, only one row is needed although the two rows are often convenient.

A MATHEMATICAL PICTURE OF AN EGG



3 Measurements

Length DC = l
Width AB = $2b$
Height OD = h

I was shown recently, by a member of the poultry department at University of Guelph, a study of the shapes of eggs, with a view to getting a mathematical model for a study of resistance to breakage.

The coordinants and the 1st derivative must be the same at intersection of the parabola and ellipse.

It makes an interesting problem to locate this intersection.

Apparently there is quite a considerable literature on this subject.

Example: l = 6.0 cm
$2b$ = 4.1 cm
h = 3.6 cm

Ellipse $\frac{x^2}{(2.05)^2} + \frac{(y - 3.6)^2}{(2.4)^2} = 1$

Parabola $x^2 = 1.35y$

OG = d = .92 cm

Contributed by E. Evans formerly of East York C.I.

Using my rule, starting with 75 this sequence is generated:

75, 35, 15, 5

Using the same rule, starting with 47 the sequence is:

47, 28, 16,6

Using my rule and starting with 77 generate the sequence.

BATCH PROCESSING - AN EDUCATIONAL STUMBLING BLOCK

A number of pertinent concepts evolved from a workshop conducted by J. Walsh at Althouse College of Education in June of 1973. First, batch processing as a retarding element in educational progress; second, a computer studies committee, and finally, business-education liaison.

One of the effects of the implementation of HSI is the concept of integrated studies. At present, education in computer studies is being taught as an independent discipline, complete in itself, and only at the secondary level. It is typically handled by the Business Education department and/or the Mathematics department. Our conviction is that computers should be involved in education to a much broader extent, and should be used at the elementary level as well as in the high school. Further, computer studies in its present highly departmentalized form (Data Processing, Computer Science, Computer Technology, Programming, etc.) will be so totally revised as to become non-existent. Data Processing will not be a separate course; it will be an integral part of Accounting, Typewriting, History and English courses. Computer Science will not be a separate course, but will be an integral part of Science, Math and Electronics courses. Computer Technology will not be a separate course, but will be an integral part of Physics, Electronics, Business Machines, Math and Office Procedures courses.

Batch processing is the retarding element in this educational progress. For these changes to take place, an interactive mode is necessary as opposed to batch processing. The interactive mode via time-sharing provides direct access for many users simultaneously. This technique permits many educational applications which would be technically impossible using batch processing.

Examples include: simulations, computer assisted instruction and computer managed instruction. Time-sharing also eliminates the turn-around time problem, a feature especially important in dealing with elementary school children. This approach presupposes the use of a simple language - e.g. BASIC or its equivalent. There is still a place, however, for batch processing - in larger student programs and in administrative applications.

The Ministry of Education is presently restricting expansion into this field by imposing a ceiling of $35,000. on grants for equipping computer studies rooms in Ontario. This ceiling effectively eliminates any consideration of time-sharing systems. At the present time the Ministry is spoiling the ship for a ha'p'orth of tar; even in these times of tight budgets, we think that the Ministry should reconsider the grant structure related to computer studies. It should examine carefully the advantages of time-sharing as suggested in this paper. It should also examine the concept of renting systems as opposed to purchase of systems. Any possibility of a real educational advance via the medium of the computer is a place for opening the purse strings.

In education, computer studies is the most dynamic area, in that it is directly related to modern computer technology and hence necessitates a constant updating of the personnel involved, namely the teacher. To assist in this updating function, we feel that regional computer studies committees should be organized. These committees would draw their membership from data processing teachers, computer science teachers, computer technology teachers and any resource persons deemed applicable by the aforementioned. We are organizing a local Computer Studies Committee which we hope will involve teachers from all eighteen schools in our board. We see this committee as being a forum for the exchange of pertinent information relating to

(to page 4)

MAIN THINGS TO KNOW ABOUT METRIC (FOR YOUR EVERYDAY LIFE)

THE METRIC SYSTEM IS EASY TO LEARN

- IT IS BASED ON THE DECIMAL SYSTEM LIKE OUR MONEY

  $1 = 100¢ 1 metre = 100 centimetres

- THERE ARE ONLY ABOUT 10 COMMON UNITS YOU ARE LIKELY TO NEED AND SOME YOU ALREADY KNOW

  TIME AND ELECTRICITY WILL BE MEASURED IN THE SAME UNITS AS AT PRESENT (though the 24 hr. clock will likely be common)

  * BASIC LENGTH UNIT - ONE METRE (m) (a little longer than a yd.)
  * BASIC CAPACITY UNIT - ONE LITRE (l) (a little smaller than a qt.)
  * BASIC WEIGHT (MASS) UNIT - ONE GRAM (g) (about the wt. of 2 paper clips)

- THE MOST COMMON PREFIXES (to be used with basic units)

  MILLI - one-thousanth (0.001)
  CENTI - one-hundredth (0.01) of the basic unit
  KILO - one-thousand (1000)

- THESE UNITS AND PREFIXES COMBINE TO GIVE US SOME OTHER COMMONLY USED UNITS

  Millimetre: .001 m (diameter of paper clip)
  Centimetre: .01 m (about width of nail of small finger)
  Kilometre: 1000 m (a little more than 1/2 milli)
  Kilogram: 1000 g (a little more than 2 lb. - a half kilo(gram) will likely be called a lb. as it is in Europe)
  Millilitre: .001 l (5 of them make a teaspoon)

- OTHER USEFUL UNITS

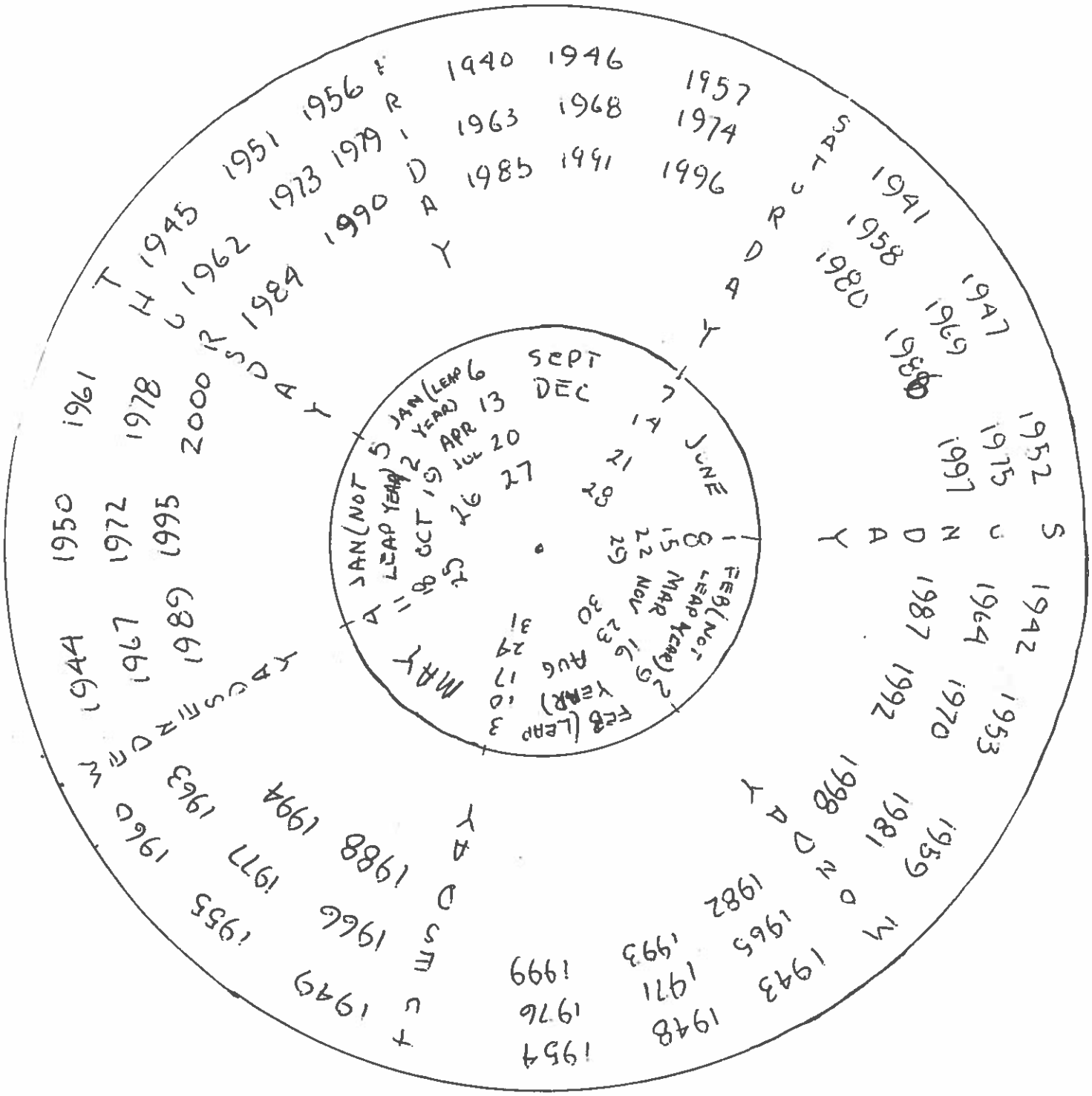
  hectare: a 100 metre square (about 2 1/2 acres)
  tonne: (about one ton)
  °C: degrees celsius (formerly centigrade) for temperature
  water freezes at 0°C water boils at 100°C room temp 22-24°C

OTHER UNITS AND PREFIXES IN SYSTEM INTERNATIONAL (SI) UNITS

°K - kelvin (scientific temperature scale)
candela (unit for light intensity)
mega (prefix meaning one million)
micro (prefix meaning one millionth)
radian - (unit for plane angle measure)

It is probable that commas will disappear between groups of 3 digits with only a half space left. We may eventually go to the decimal comma used in Europe. (Recall Olymics score boards)

A PERPETUAL CALENDAR



Rotate the inner circle so that the month is against the year. Read off the day against the number. Are there any patterns?

THE OAME ABACUS

"MATHEMATICS EDUCATORS
SHARE THEIR IDEAS"





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TROUT LAKE