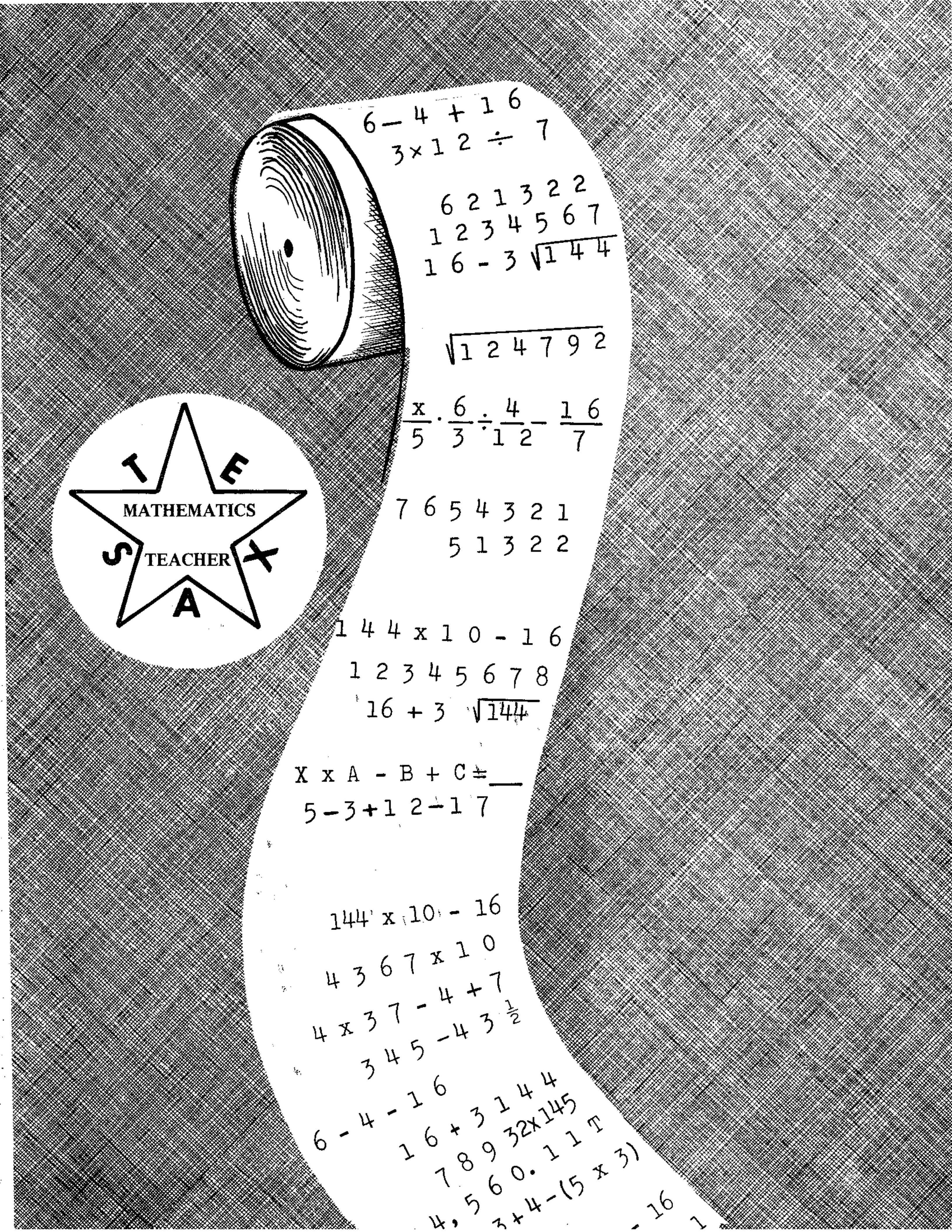
TEXAS
MATHEMATICS
TEACHER
6 − 4 + 1 6
3 × 1 2 ÷ 7
6 2 1 3 2 2
1 2 3 4 5 6 7
1 6 - 3 √1 4 4
√1 2 4 7 9 2
x/5 · 6/3 ÷ 4/12 − 16/7
7 6 5 4 3 2 1
5 1 3 2 2
1 4 4 x 1 0 - 1 6
1 2 3 4 5 6 7 8
16 + 3 √144
X x A - B + C = __
5 − 3 + 1 2 − 1 7
144 x 10 - 16
4 3 6 7 x 1 0
4 x 3 7 - 4 + 7
3 4 5 − 4 3 ½
6 - 4 - 1 6
1 6 + 3 1 4 4
7 8 9 32x145
4, 5 6 0. 1 1 T
3 + 4 − (5 x 3)

TEXAS MATHEMATICS TEACHER is the official journal of the Texas Council of Teachers of Mathematics. The views expressed are the contributor's own and are not necessarily those of the publisher or the editor. All manuscripts and correspondence about this publication should be addressed to Mr. J. William Brown, *Texas Mathematics Teacher*, 100 So. Glasgow Drive, Dallas, Texas 75214.

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TEXAS MATHEMATICS TEACHER

Texas Council of Teachers of Mathematics

Volume XXXII OCTOBER, 1985 No. 4

PRESIDENT'S MESSAGE

As the new school year begins let us resolve anew to do the best job of teaching mathematics of which each of us is capable, to do a better job than we did last year, to continue to learn and to grow in our profession. One method of increasing our knowledge and improving our skills is attending and participating in professional meetings. While we do not have the Annual Meeting of NCTM in our state this year as we did last year, there are many opportunities available, such as:

- 32nd Annual Conference for the Advancement of Mathematics Teaching (CAMT), October 24–26, 1985, in Austin (Several of you have volunteered to work in on-site registration? others are welcome.)
- Albuquerque Meeting of NCTM, October 3-5, 1985, Albuquerque, New Mexico. (It may be too late, but I would hope that far West Texas, High Plains, and Panhandle members might be able to attend.)
- Dallas Meeting of NCTIM, February 27–March 1, 1986, in Dallas (Where else?)

And, of course, the meetings of local councils, though smaller in scope, are handy and often focused on topics of immediate interest to local members. In fact, I am asking local councils to submit their program shcedules to the editor of this journal for sharing with all of us. The purpose is twofold: (1) to let us know what is going on around the state, and (2) to provide ideas to other local councils for programs.

It has come to my attention that there are still large numbers of mathematics teachers in this state, at all levels, who have never even heard of the CAMT Conference, nor attended any NCTM, TCTM, or local council program. That is something that we all can work to change. Talk to your colleagues; encourage them to join us, their local council, and NCTM; invite them to the CAMT Conference. And **you** are invited to the CAMT Conference, too, for our Annual Meeting is held in conjunction with it. Please come, and bring a friend! ! !

ELECTION RESULTS

The following officers were elected in the July balloting. These officers will serve for the next two years.

President-elect: Maggie Dement, Spring Branch ISD
Vice President: Cathy Rahlfs, Humble ISD
Secretary: John Huber, Sam Houston State University
Treasurer: Bettye Hall, Houston ISD
Southwest – Regional Director: Elgin Schilhab, Austin ISD
Southeast – Regional Director: Judy Tate, Harris County Dept of Education

The Nominating Committee wishes to recognize Helen Ward, Houston ISD for her assistance with the election. Thanks a heaps! Thanks also to those of you who offered write-in candidates. These names will be passed on to next year's Nominating Committee.

We wish all the new officers the best of years. Good luck to all.

The Nominating Committee
1984–85

CAMT

The 32nd Annual Conference for the Advancement of Mathematics Teaching (CAMT) will be held October 24–26, 1985, at the Hyatt-Regency Hotel and the Palmer Municipal Auditorium in Austin, Texas. The theme of this year's conference is "Mathematics: Teaching the Problem Solvers of Tomorrow."

THE NEED TO TRAIN TEACHERS TO USE MANIPULATIVES FOR TEACHING MATHEMATICS

by Loye Y. "Mickey" Hollis and B. Dell Felder
University of Houston--University Park

Manipulatives are useful if not essential aids for learning mathematics. They provide learners with the tactile and visual experiences that help them understand mathematical concepts and algorithms. This process provides a mathematical model that can be a readiness for solving problems.

Bruner (1965), Dienes (1960), and Piaget (1953), among others, recommended the use of manipulatives. Research studies by Branch (1973); Harshman, Wells and Payne (1962); Knaupp (1977); Carmody (1970); Portis (1972); Churchill (1958); Wallace (1974); Vence and Kieren (1972); and Weber (1979) support the use of manipulatives as a means of improving mathematics understanding. The conclusion that the use of manipulative aids will improve student performance in mathematics is soundly grounded in research findings.

The Texas Education Agency has prescribed that manipulatives be used for mathematics instruction. Sound as this requirement may be, there is likely to be a problem associated with its implementation.

The problem may reside with the teachers. Many teachers have not been trained to use manipulatives properly and do not view them as helpful in mathematics learning. They may not use manipulatives when they are provided, and they may not use them correctly if they do use them. The way teachers respond will determine the extent to which manipulatives become useful aids.

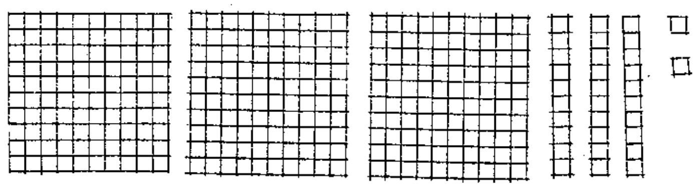
As university professors, we have the opportunity to visit many schools. Far too often, we have discovered excellent manipulative materials gathering dust in classroom closets. Many times the materials are brand new, and the packages have never been opened. Why? When the evidence so clearly establishes the benefits of using manipulatives to teach mathematics, why would teachers ignore them? The fact is, many teachers do not believe they have value for mathematics learning. When teachers hold that opinion, placing manipulative materials in their classrooms will not change what they do.

Few teachers have been adequately trained to use manipulatives. It is a complex skill, and not one that a teacher would likely learn independently. Most teachers were not taught mathematics that way and, until recently, many teacher preparation programs did not emphasize this skill. As a result, many teachers do not know how to use manipulatives to maximum advantage. They do not know how to use manipulatives in ways that replicate the algorithm or how to bridge between manipulatives and the abstract concept they are trying to teach. As a consequence, students are often confused rather than enlightened by the process. One common mistake teachers make when they use manipulatives is that they expect students to learn the manipulations and then the abstraction with no guidance to the connection between the two. Teachers cannot assume their students will be able to see the relation between manipulatives, pictures, and symbols. Teachers need to provide activities that help students see how the moves made with manipulatives can be pictured with drawings and that both can be expressed with symbols.

This procedure can be illustrated using the problem
332 - 156 = (   ).

The first move is to write then illustrate the problem. The following shows this move:

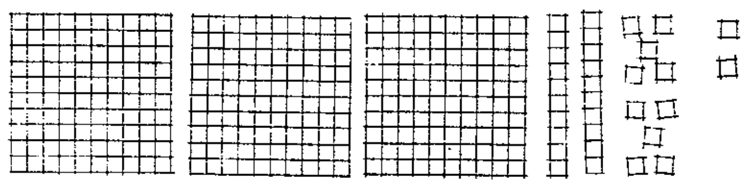
Figure One



3 hundreds   3 tens   2 ones

The second move is to decide there are not enough ones and then change one ten to ten ones resulting is twelve ones. Using base ten blocks, this would mean replacing one long (ten) with ten units (ones).

Figure 2

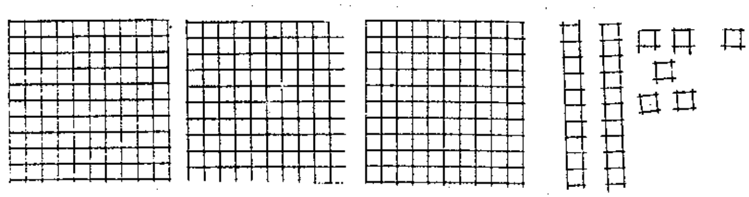


```
    12
 3 3̸ 2̸
-1 5 6
------
```

It should be noted that the 156 has not been initially illustrated. Experience has taught us that initially illustrating the number being subtracted is confusing to students and often leads to misunderstanding and errors. However, when the number has been subtracted, it is illustrated and can be used to check for correctness. (See Figure 6)

Move three is the subtraction of six ones from twelve ones leaving six ones. When using manipulatives, six units would be relocated. It can be pictured as follows:

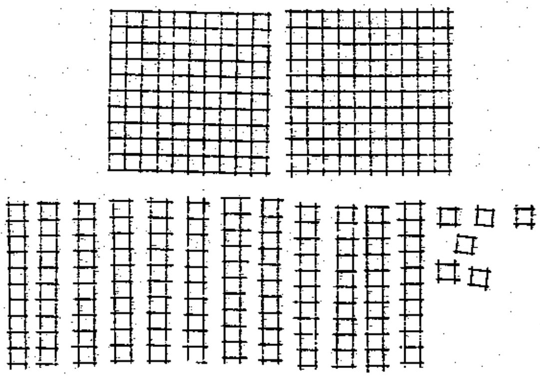
Figure 3

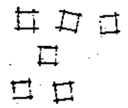


```
    12
 3 3 2̸
-1 5 6
------
     6
```

Move four is to decide there are not enough tens and then change one flat (hundreds) to long (tens) resulting in twelve longs.

Figure 4

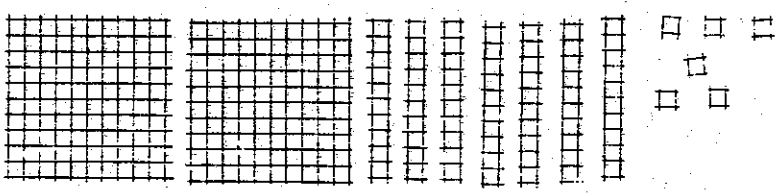


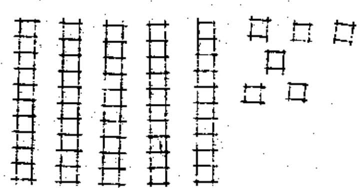


```
  2 12 12
  3  3  2
- 1  5  6
---------
         6
```

Move five is the subtraction of five tens from twelve tens leaving seven tens. When using manipulatives, five longs would be relocated. It can be pictured as follows:

Figure 5

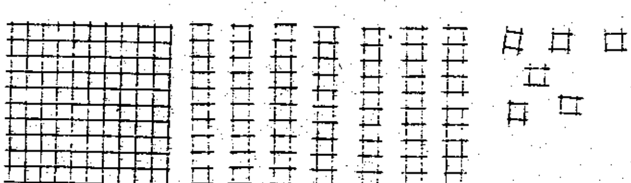


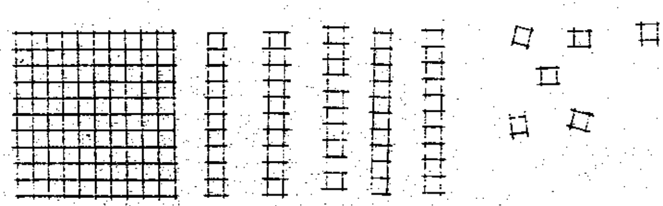


```
  2 12 12
  3  3  2
- 1  5  6
---------
      7  6
```

Move six is the subtraction of one hundred from two hundreds leaving one hundred. With manipulatives, a flat would be relocated. It can be pictured as follows:

Figure 6

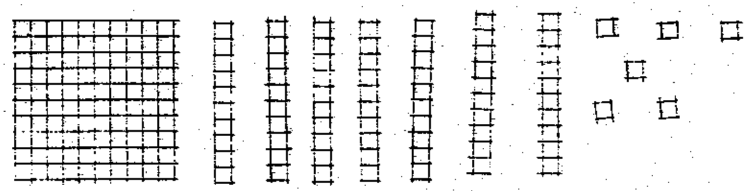




```
  2 12 12
  3  3  2
- 1  5  6
---------
  1  7  6
```

The final move results in the answer 176 pictured as follows:

Figure 7



1 hundred 7 tens 6 ones

Each of the preceding moves can be made with manipulatives and/or drawn. Moves can also be recorded with symbols after having been made. This helps to establish the linkage between manipulatives, pictures, and symbols.

The effective use of this teaching skill requires sound understanding of mathematical concepts and sensitivity to children's reactions to various instructional media. There is much more to the process than gathering popsicle sticks and counting beans, yet many teachers have not been adequately trained to use these strategies effectively.

The teaching profession should not expect that most teachers already know how to use manipulatives properly or that they will be able to develop that teaching skill without assistance. As long as teachers believe that the use of manipulatives makes mathematics more difficult for their students, they will remain unwilling to use them. The boxes will stay in the closets. When teachers are taught to use manipulatives effectively, however, they see their value for helping students. Widespread training to prepare teachers to use these materials effectively is needed if we are to have widespread gains in student achievement in mathematics.

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GRAPHING PARABOLAS WITHOUT COMPLETING THE SQUARE

Bella Wiener, Pan American University, Edinburg, Texas

Recently there has been considerable interest in problems concerning the derivation of the quadratic formula without "completing the square" (1, 2, 3). The purpose of this paper is to develop a simple method of graphing parabolas that also avoids the usual computation of the coordinates of the vertex by completing the square. At the same time our approach is very elementary and does not employ the notion of the derivative.

The simplest parabola $y = x^2$ is symmetric about the y axis. If the graph of the quadratic trinomial

$$y = ax^2 + bx + c \quad (a = 0) \qquad (1)$$

is symmetric about the vertical line $x = k$, then this line is the axis of symmetry of the given graph which is also called a parabola. We prove that this axis of symmetry really exists and find its equation. first, we put $x = 0$ in equation (1) and see that $y = c$ is the y intercept of the parabola.

Now, assume for a moment that the axis of symmetry $x = k$ exists. The question arises as to what are the coordinates about the axis $x = k$. Since the line $x = k$ is a perpendicular and its y coordinate is c. Therefore, the coordinates of the point $B_1(2k, c)$ satisfy (1):

$$a(2k)^2 + b(2k) + c = c,$$

that is, $2ak + b = 0$, and $k = -b/2a$. This means that the axis of symmetry is

$$x = -\frac{b}{2a}. \qquad (2)$$

The abscissa of the vertex V of the parabola (1) is given by (2). To find its ordinate, it remains simply to substitute $-b/(2a)$ for x in (1):

$$y = \frac{b^2}{4a} - \frac{b^2}{2a} + c$$

or

$$y = \frac{-b^2 + 4ac}{4a}$$

Since we know the equation of the axis $x = \frac{-b}{2a}$, the vertex $V\left(-\frac{b}{2a}, \frac{-b^2 + 4ac}{4a}\right)$, and two symmetric points $B(0,c)$ and $B_1\left(-\frac{b}{a}, c\right)$ on the parabola, it is very easy to sketch its graph.

To prove that the line $x = -b/(2a)$ is the axis of symmetry of parabola (1), we locate on the parabola a point P whose abscissa is

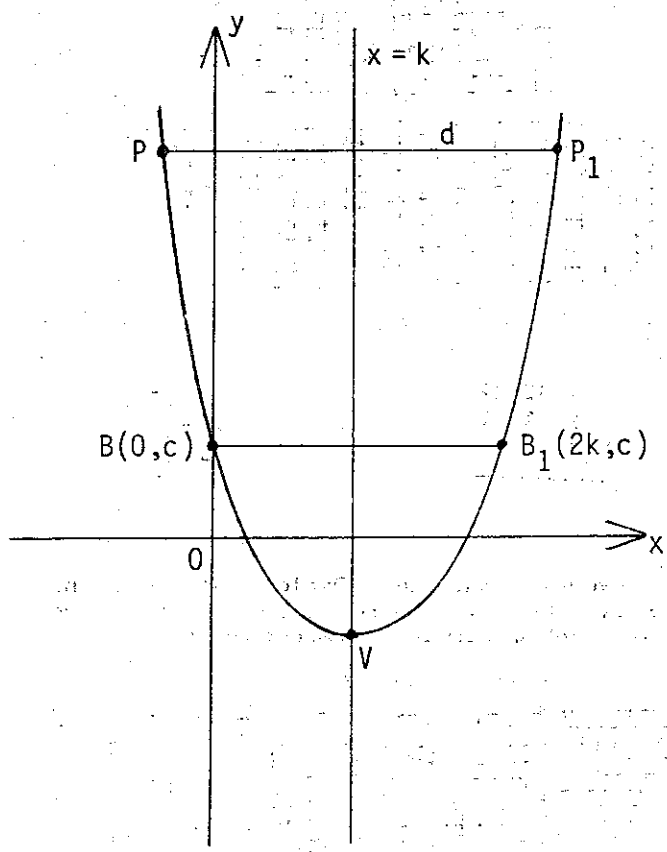
$$-\frac{b}{2a} - d,$$ where d denotes the distance from P

to the vertical line $x = -b/(2a)$. This line will be the axis of symmetry if we prove that the point P_1 whose abscissa is $-\frac{b}{2a} + d$ also lies on the parabola, that is, if the equality

$$a\left(-\frac{b}{2a} - d\right)^2 + b\left(-\frac{b}{2a} - d\right) + c =$$

$$+ a\left(-\frac{b}{2a} + d\right)^2 + b\left(-\frac{b}{2a} + d\right) + c$$

holds true for any value of d. Simple computations confirm this assertion.



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STUFF Strategic Tactics Ultimately For Fun

Dear T.C.T.M. Members,

We are back! This is the fall, isn't it? Was there a summer? We think we missed the big event. We must have been in the book room!

We are still searching for inspiringly, intellectual endeavors, but anything you have used successfully with your students will do. Remember, we give free memberships to contributors.

To celebrate the beginning of a new and wonderful school year we are making an offer you can't refuse. The first person who sends the written solution to the senior high "Who did it" puzzle, from the May, 1985 issue, will receive an official Stuff tee shirt. Be sure to send your tee shirt size with your solution or you may be "stuffed stuff in Stuff!

Our address is Judy Tate or Betty Hall, Harris County Department of Education, 6208 Irvington Boulevard, Houston, Texas 77022.

Love,

"Stuff" Staff

NUMERATION COOKIES

This numeration activity provides a motivating as well as delicious manipulative activity. Prepare in advance 3 numeral cookies per student using numeral cookie cutters available at kitchen/cooking stores or from the Current, Inc., mail order catalog for under $10. (#259-75153, Current, Inc., The Current Building, Colorado Springs, CO 80941)

The teacher distributes three cookies of different numerals per student and then directs the arrangement of the numerals with directions like the following:

Arrange your cookies

1) in order from the smallest numeral on the left to the largest on the right (ex. 567)
2) in order from the largest on the left to the smallest on the right (ex. 765)
3) with the largest numeral in the tens place (ex. 675 or 576)
4) with the smallest numeral in the ones place (ex. 765 or 675) and so forth

A quick visual check by the teacher will indicate which students need individual assistance. Students can be asked to read their answers aloud for the class to check their arrangements. The activity concludes with a silent devouring of all three numeral cookies.

This manipulative activity providing visual, auditory, and gustatory stimulation will long be remembered.

Submitted by

Suzanne Sellner
Humble I.S.D.

PRIMARY

RHYME TIME

Take the number that rhymes with shoe.
Multiply it by the rhyme of tree.
Add it to the rhyme of pour.
Then subtract the rhyme of new.
Divide this by the rhyme of door.
Add this to the rhyme of free.
Divide this by the rhyme of drive.
The answer you will get will rhyme with fun.

INTERMEDIATE

CLUES

Children will enjoy being the detectives who try to solve the mystery using the clues. Could you solve the two below:

I

a) there are 7 numbers
b) all are odd
c) the sum is 13

II

a) there are 4 numbers
b) none are even
c) the sum is 24

Without changing the order of any of the numbers, can you make this into a valid equation?

2 9 6 7 = 17

What number is

a) between 1 and 100
b) smaller than 50
c) not an odd number
d) not smaller than 20
e) not a multiple of 4
f) not a multiple of 5
g) not larger than 30
h) not the same if the two digits are interchanged

MIDDLE SCHOOL

DART GAME

1. A group of students were playing a game of darts after school one day using a game board of concentric circles drawn with radii whose measurements were 1 unit, 2 units, 3 units and 4 units.

   Draw a game board like theirs after deciding what you want to use for a unit of measure (one inch, 3 centimeter, 10 centimeters, ?).

   Scoring

   #1 = 30 pts.
   #2 = 23 pts.
   #3 = 17 pts.
   #4 = 9 pts.

2. One of the students said that the scoring on this board was unfair because the region in which a hit could score the greatest number of points was the smallest of the four regions, and that as the regions became larger the number of points you could score with a hit became less. Is it true? Compute the areas of the four regions.

   #1 ________ #2 ________ #3 ________ #4 ________

3. How much larger is the area of regions #4 than #1? ________

   How much larger is the area of region #3 than #2? ________

   How much smaller is the area of region #1 than #2? ________

4. If you throw five darts all of which hit in the scoring areas, in which regions would you have to hit to score a total of

67 points?

96 points?

123 points?

5. Can you score 100 points in 5 throws? In any number of throws? What is the greatest total you can score in the five hits on this dart board?

DO YOU THINK THAT IT'S PROBABLE?

The concept of probability takes on clearer meaning when children do some hands-on investigating.

Ask each student to cut out and to bring to class a fairly long newspaper article. Have the children tally the lengths of the words in the story -- the number of words that have one letter, two letters, three letters and on up. Then ask them to answer the following questions:

1. What is the total number of words?
2. Which word length occurs most often?
3. Write the fraction of your article that has each word length:

1 letter ________	6 letters ________
2 letters ________	7 letters ________
3 letters ________	8 letters ________
4 letters ________	9 letters ________
5 letters ________	10 letters ________

more than 10 letters ________

4. Do you think the count will be the same for another article?
5. Try it. Which word length occurs most often this time? Is it the same as before? Why do you think this is so?

The children can now combine their results with a group or the whole class and answer these questions:

Which word length is most frequent?

Is it the same length as your most common length?

What word length do you think is most common in English? Why?

(From What Are My Chances? Book A, Creative Publications)

- - - - - - - - - - - - -

You may not recognize them at once, but the following are good old fashioned proverbs written in governmentese. How many of them can you reword to the original form?

Pulchritude does not extend below the surface of the derma.

Each canine passes through his period of pre-eminence.

Consolidated you and i maintain ourselves erect; separated we defer to the law of gratity.

You cannot estimate the value of the contents of a bound, printed narrative or record from its exterior vestures.

Socially oriented individuals tend to congregate in gregariously homogenous groupings.

Fondness for notes of exchange constitutes the tuberous structure of all satanically inspired principles.

SENIOR HIGH

EXERCISES ON THE PYTHAGOREAN THEOREM

A baseball diamond is a square 90 feet on a side. What is the distance from home plate to second base?

Prove that it is impossible to make an umbrella which is 27 inches long lie flat on the bottom of a suitcase whose dimensions are 24 in. x 10 in. x 4 in.

Find the legs and altitude of an isosceles trapezoid whose base angles (1 pair) are 45 degrees each and whose bases are 12 and 16.

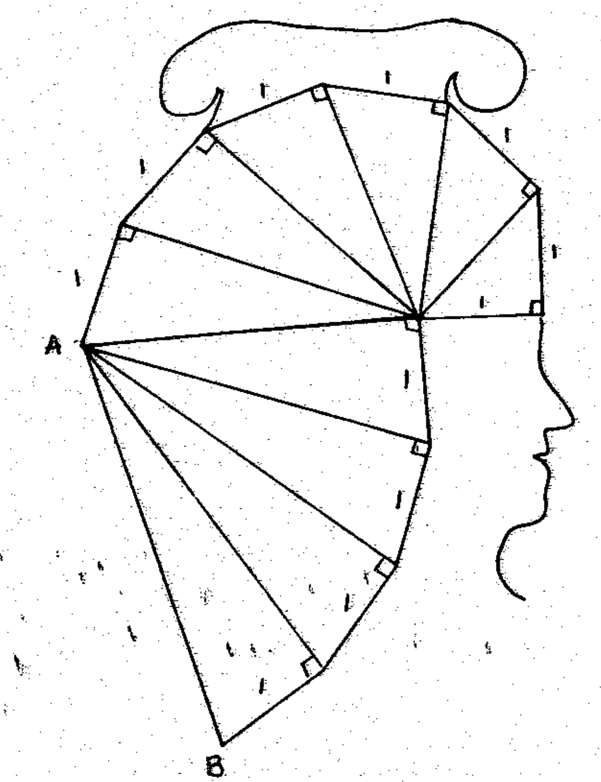
Find the side of an equilateral triangle whose altitude is 96 inches.

Find the diagonal of a square whose perimeter is 40.

- - - - - - - - - - - -

This activity requires the repeated use of the Pythagorean Theorem. AB = 11

THE ROMAN HELMET



The length of AB is ______________.

NOTICE

The Educational Materials Committee of the National Council of Teachers of Mathematics is now seeking manuscripts for the 1988 NCTM Yearbook, "Algebraic Concepts in the Curriculum, K-12". The Yearbook Editor is Professor Arthur Coxford of the University of Michigan. The Yearbook Advisory Panel is interested in papers addressing important issues in the teaching of algebra at all levels in the curriculum, and is also particularly interested in relatively short papers reporting proven classroom practices in teaching specific algebraic topics. Guidelines for the preparation of manuscripts are available from the General Editor, Albert P. Shulte, Oakland Schools, 2100 Pontiac Lake Road, Pontiac, MI 48054.

PROBLEMS AND CONTESTS

Diane McGowan

A mathematical competition which requires no specific subject content can challenge students in problem solving and produce a variety of solutions. The following problems were part of a mathematical reasoning test compiled by Crockett High School, Austin, Mu Alpha Theta members for a spring math competition. The test was given to two divisions 9th-10th and 11th-12th. It could be used as a group activity for a class or math club meeting or as an intraschool competition.

1. When the members of a band are arranged in rows of 2,3, or 4, there is always one person left over. However, when they are arranged in rows of 5, the rows are even. What is the minimum number of people in the band?

2. How many different ways can you make change for a 50 cent piece without using pennies?

3. A, B and C are thermometers with different scales. When A reads 12 degrees and 36 degrees, B reads 13 degrees and 29 degrees. When B reads 20 degrees and 32 degrees, C reads 57 degrees and 84 degrees. If the temperature drops 18 degrees using A's scale, how many degrees does it drop using C's scale?

4. If the value of CHRISTMAS is 110, what is the value of NEW YEAR?

5. How many integers less than or equal to 90 has either 2 or 3 as a factor but not 6?

6. Given 5 positive fractions: A/B, C/D, E/F, G/H and I/J such that CH < DG , GB < AH, IF < EJ , AJ < BI. Which fraction is the greatest?

7. In How many ways may three people divide 25 pieces of candy so that each person gets at least one piece?

8. Eureka School District offers three intramural sports: volleyball, softball and soccer. there are 50 students in all three sports. 100 students in both volleyball and softball, 150 students in both volleyball and soccer, 200 students in both softball and soccer, 450 students in softball, 250 students in volleyball and 400 students in soccer. How many students are there altogether in the intramural program?

9. Some hikers start on a walk at 3:00 p.m. and return at 9:00 p.m. If their speed is 4 mph on level ground, 3 mph uphill and 6 mph downhill, how far did they walk?

10. In a race of x yards, A beats B by 30 yards, B beats C by 20 yards and A beats C by 45 yeards. Find x.

Answers: 1. 25 2. 10 3. 27 degrees 4. 91 5. 15 6. E/F 7. 276 8. 700 9. 24 miles 10. 120 yards

This issues Challenge Problem is from a previous issue of The Mathematical Log, the publication of Mu Alpha Theta, the national honors mathematical organization for high school and junior college students. The problem was presented by Log editor Dr. Don Allen.

A room is 30 feet long, 12 feet wide, and 12 feet high. In the middle of the end wall and 1 foot above the floor is a spider. In the middle of the other end wall, 1 foot below the ceiling, is a fly. The spider wishes to capture the fly. Walking on walls, floor, or ceiling, as necessary, compute the length of the shortest path from the hungry spider to the stationary fly.

Please present this problem to your students and have them send their solutions to Diane McGowan, Route 1 Box 259, Cedar Creek, TX, 78612. Solutions will be published in the next issue. Your contribution of problems and competition ideas are necessary if this column is to continue.

RX: HOLISTIC MATHEMATICS

by Manda Lively, Director of Instruction, Willis, Texas ISD

Mr. Putty (wood shop teacher): "Wonder what kids do in math classes these days? They surely don't learn how to use a ruler."

Ms. Fulcrum (physical science teacher): "Or the metric system! Every year I hope it will improve, but so far -- nothing!"

Mr. Putty: "I believe it! Do you know that in my third period class only two students could find 7 1/4" on their tape measures."

Ms. Fulcrum: "Well at least you had two. Try asking a freshman class to show you approximately how long a centimeter is!!"

As indicated by the conversation above, there is currently a high level of concern over the inability of students to transfer mathematics skills learned (mastered?) in the classroom to other subject matter areas or to the real world. This inability is a result of teaching practices which isolate mathematics concepts and fail to relate them to each other or to real situations. A holistic approach which emphasizes the interrelatedness of mathematics concepts as well as their relationship to the real world is needed.

The objective of this article is to demonstrate ways in which many aspects of mathematics can be integrated into one mathematics lesson. It will show that although a lesson has a primary objective, it can address many others through reviewing prior learnings or laying the groundwork for future ones. Concept development should not be an isolated activity. To have value, concepts must be tied to prior experiences and to the world in which the student lives.

Building the interrelatedness of mathematics can be accomplished through: (1) the use of appropriate questioning, (2) the practice of making concept generalizations or summary statements, and (3) the application of the experiential approach. Prior learning experiences can be reviewed through questioning which relates a past experience to the current one. Summary statements require students to verbalize their learnings. Expressing new ideas in their own words makes them process the ideas in such a way that the ideas are internalized and become part of the student's reference system. The experiential approach allows students to put the concept in a real world context. If Mary is involved in the act of measuring in math class--whether it is her book or her desk or the width of the door--rather than doing only computation with measures, she is more likely to be able to find 7 1/4" on her tape measure in wood shop.

Below are examples of several math problems with possible (1) questions, (2) summary statements, and (3) experiential activities to use with each. An effort has been made to include questions, statements, and activities from as many of the eight major strands of mathematics outlined by 19 TAC Chapter 75 Curriculum, March, 1984, as possible.

PROBLEM A:

```
  1342
  X 57
  9394
 67100
 76494
```

(1)

a. How many hundreds are in the multiplicand?
How many tens are in the product?
In the first partial product, the 4 is in which place?

b. Round the multiplicand to the nearest hundred.
Round the multiplier to the nearest ten.
Estimate the product of these two numbers to the nearest hundred.
What is it?
How does the estimate compare to the product in this problem?
Why is it larger/smaller?

c. (Tasks for pairs of students.)
Write a stated problem about this multiplication problem.
Find a geometric figure and problem for which this computation will provide the correct answer. Determine what the appropriate label for the product should be.

(2)

a. In your own words, define multiplication.

b. What does the problem 1342 X 57 mean?
How is that different from 57 X 1342?
What property of mathematics do these two problems illustrate?

(3)

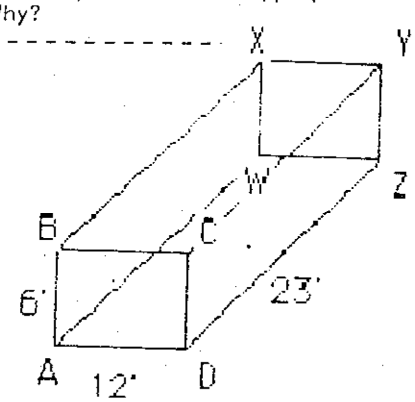
a. Create a frequency table based on the number of times each digit is used in this problem.
Which is used the most? Its frequency is what percent of the total frequency?
Which is used the least? Its frequency is what percent of the total frequency? Express this percent as a decimal.
Is there a mode? If so, what is it?
What is the median?

b. Using the data from the frequency table above, create a graph.
What type of graph (bar, line, circle) is most appropriate?
Least appropriate? Why?

PROBLEM B:

l = 23'
h = 6'
w = 12'

V = lwh
= 23 12 6
= 1656 cu'



(1)

a. Round the volume to the nearest hundred. What is it?
To the nearest ten. What is it?

b. Is the width more or less than half the length? More or less than one-third the length?
What fractional part of the length is the height?

c. Name two line segments (not drawn) which lie entirely within this prism.
Name three line segments parallel to $\overline{DZ}$.
Name two line segments perpendicular to $\overline{WX}$.
Name the face parallel to ABXW.

d. How many cubic feet are in a cubic yard? Estimate the volume of this prism in cubic yards.
What is the area of rectangle ABCD? Of rectangle CDZY?
Calculate the surface area of this prism.

(2)

a. In your own words, define volume.
The formula for the volume of a rectangular prism is V = l•w•h.
Write a sentence which converts this formula to "English".

b. Describe one cubic yard.

(3)

a. Find two objects in the real world which are approximately the same size and shape as this rectangular prism. What are they? How are they used?

b. Measure the length, width, and height of your classroom to the nearest foot. What is its length? Its width? Its height?
Is the width more or less than that of the rectangular prism? Is the length more or less than that of the rectangular prism?

What is the volume of your classroom? What percent of the volume of the rectangular prism is the volume of your classroom?

- -

PROBLEM C: (Data generated by a class of 26 students.)

on what day of the week were you born?

Place an "X" above the day of the week on which you were born.

S	M	T	W	Th	F	S
		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

(1)

a. Is the combination of students born on Wednesday and Friday greater than, less than, or equal to those born on Tuesday?

b. What fractional part of the students was born on Sunday? On Wednesday? Not on Thursday?

Express as a decimal the fractional part of the students born on Tuesday. On Friday and Saturday combined.

What percent of the students was born on Friday? What percent was not born on Wednesday?

c. Write a number sentence to show the total number of students born on Monday, Wednesday, and Friday.

(2)

a. (Task for pairs of students or groups of four.)

Write five summary sentences based on information from this graph.

b. When are graphs useful?

Graphs make comparisons easier. Why?

(3)

a. Using the information we have gathered for this graph, can we say that most students your age were born on Tuesday? Why or why not?

b. If we were to obtain similar information from all of the students in our school, what do you predict the results would be?

- -

It is not necessary for students to question, summarize, or experience any one problem in as many different ways as has been demonstrated. The intent of these examples has been to show the numerous ways that we, as math teachers, can remind our students of prior learning experiences, have them internalize new experiences, and relate both to the real world.

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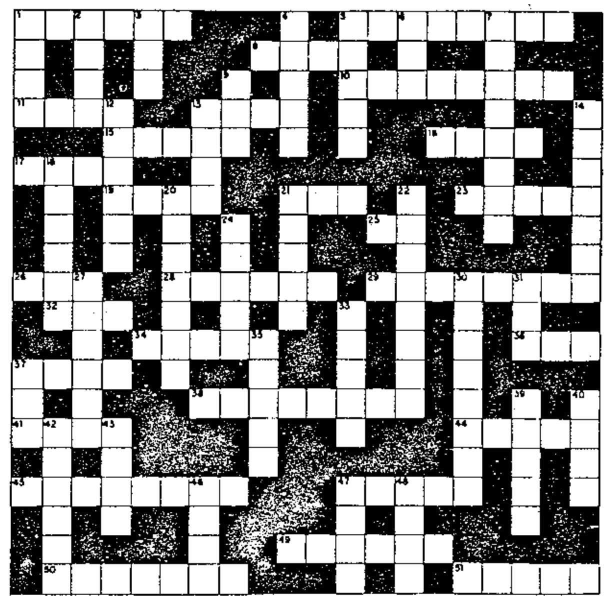

A CROSSWORD PUZZLE

By ROGER H. WOLTERS
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Pillager, MN 56473

ACROSS
1. ILCERC
5. YGRTOEEM
8. RFUO
10. DTHNAOD
11. NEEV
13. EMNA
15. NOUIN
16. NELI
17. RGMA
19. SBEA
21. AYR
23. AEPNL
25. IP
26. MSU
28. TRCMEI
29. MDATIERE
32. TSE
34. LNAEG
36. NEO
37. XIAS
38. OTNQAEUI
41. EOCN
44. MIPER
45. GALDNIOA
47. TRYOF
49. CATRFO
50. MNALUER
51. MRIPS

DOWN
1. CEBU
2. TARE
3. EGL
4. NITOP
5. APRHG
6. DOD
7. ETNIRLAG
9. NTE
12. MNUERB
13. OEMD
14. GITRENE
18. SIDRUA
20. ETMSGEN
21. TORIA
22. IDISOINV
24. LTAOT
27. DNAIME
30. LYTMLIUP
31. OTW
33. GTIID
35. LEAQU
37. CRA
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