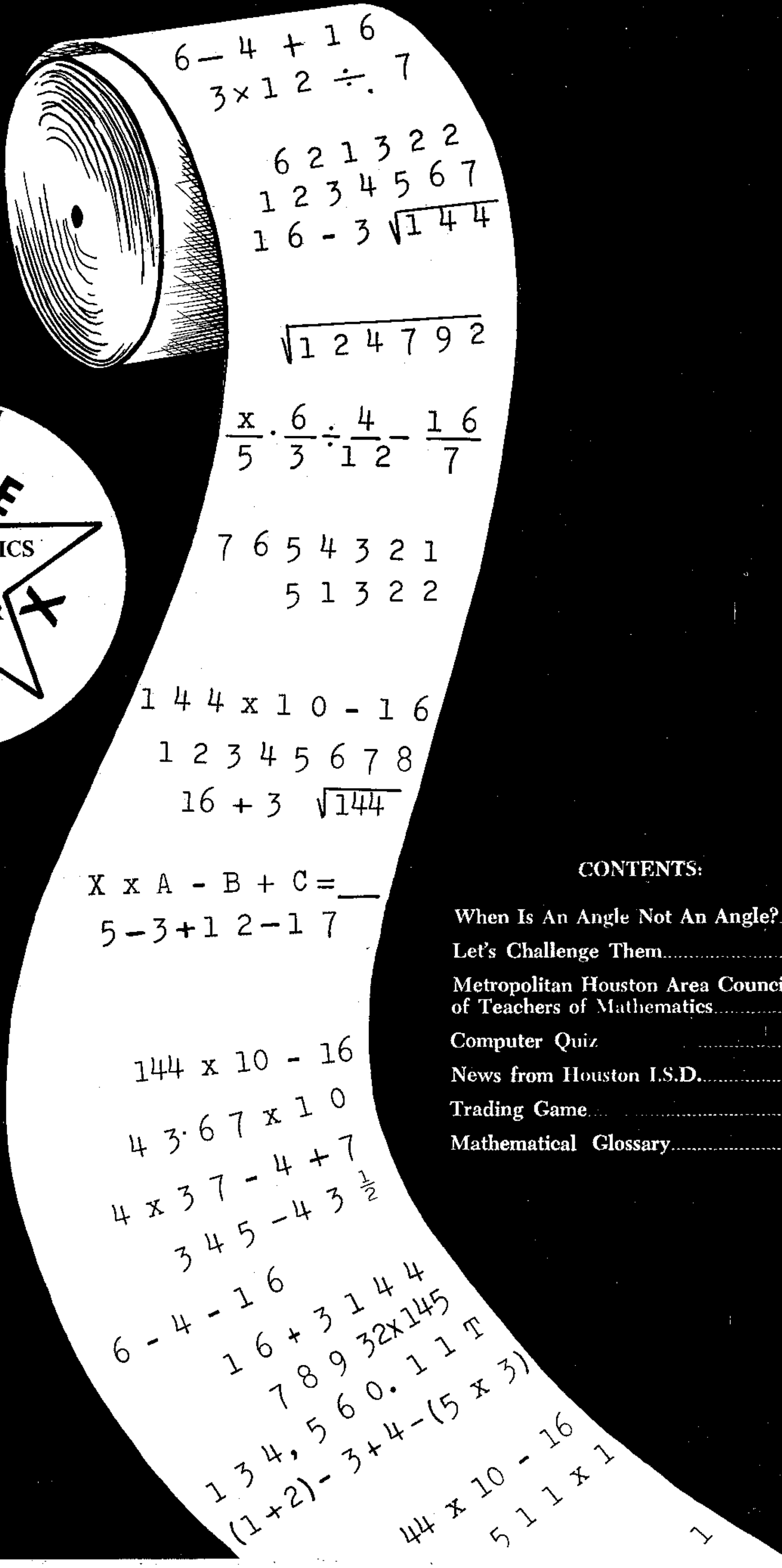
Volume I No. 1

TEXAS MATHEMATICS TEACHER

Summer



CONTENTS:

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. James E. Carson, *Texas Mathematics Teacher*, 3010 Bayshore Drive, Pasadena, Texas 77502.

TEXAS MATHEMATICS TEACHER is published quarterly by the Texas Council of Teachers of Mathematics. Payment of membership fee of $2.00 entitles members to all regular Council Publications.

THE PRESIDENT'S MESSAGE

JAMES E. CARSON

We wish to express our thanks to the advertising firms for supporting our new venture. To our members, we hope you like it. We promise to improve it as we move along.

We need information for the Journal. Please write articles, what your school is doing in mathematics, puzzles, problems or anything that will be of interest to our readers. When we get a backlog of articles and our advertisers lined up, we should be off to a good start, and with everyone's cooperation we can publish a Journal that will compare with any organization's Journal. Get this information in to me as soon as possible and as often as possible.

We have many mathematics teachers in the state of Texas and they should be members of T.C.T.M. Let's begin now to solicit memberships for the year 1971-72.

Our first workshop conducted by T.C.T.M. will be at J. Frank Dobie High School in the Pasadena Independent School District on October 23, 1971. If anyone wishes to attend and does not receive information concerning it by October 1, write to me. We do not want to leave anyone out. Let's make the first one a good one. We already have our workers lined up and we promise you that it will be a worthwhile venture.

I think that the suggestion for students to do the cover for our Journal was an excellent idea. Don't wait. As soon as school begins in the fall, conduct a contest or get some good student to come up with an appropriate idea. We will be publishing another Journal to reach you in October; therefore, we must submit it to the printer in September. Act now. Perhaps you can come up with some articles during the relaxing that you are going to do this summer. We welcome any suggestions and materials.

Remember, the more our group works and plans together, the more outstanding a job can be done in having our students obtain the best in mathematical instructions. Be a professional person and support your organization actively by joining today. This is a mark of a dedicated person. I believe that you want to be a part of such an organization.

Have a nice summer. I will be leaving for Germany the 18th of June to visit my daughter and her husband. See you next fall. ■

WHEN IS AN ANGLE NOT AN ANGLE?

ELMER RUSSELL

When is an angle not an angle? An angle is not an angle when it is an "angle of a polygon." This follows easily from the definitions of angle and polygon. An angle is the union of two rays with a common endpoint. A polygon is the union of more than two line segments whose endpoints are consecutively common. Obviously, then, the "angles of polygons" are made of line segments rather than rays and are, therefore, not angles at all.

This is rather disturbing because authors define angle in terms of rays in seventh and eighth grade textbooks and then use the term "angle" to denote "angles of a polygon." Students are asked to find the number of degrees in the "angles of a triangle." This embarassing verbal shortcoming could be easily corrected by the introduction of two new terms with their definitions.

Consider the term *anglon*. An *anglon* is defined as the union of two line segments with a common endpoint. Triangles, then, contain three line segments, three vertices, and three *anglons*.

Consider, now, the "exterior angles of polygons." Such an "angle" is usually said to be formed by one side of the polygon and the extension of an adjacent side through the common point as shown in Figure 1.

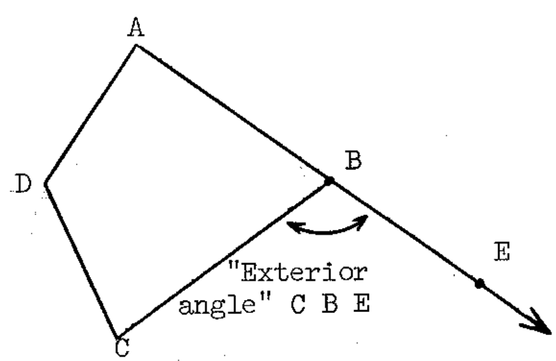


Figure 1

If the extension of $\overline{AB}$ stops at E, then $\overline{BE}$ is a line segment and CBE is an *anglon*.

But suppose that $\overline{AB}$ is extended through E so that $\overrightarrow{BE}$ is a ray. Now CBE is the union of a line segment and a ray with a common endpoint. Therefore, it can be neither an angle nor an *anglon* because it contains neither two rays nor two line segments.

A solution to this problem is to call such a union an *anglex*. An *anglex* is defined as the union of one ray and one line segment with a common endpoint. Use of the term *anglex* allows precise and correct terminology without contradicting either the definition of angle, *anglon*, or polygon.

The "exterior angle of a polygon" could either be an *anglon* or an *anglex* depending upon whether the extension of the side of the polygon is a line segment or a ray.

The same conventions presently used to denote line segments and rays could be applied easily to these new concepts. For example: anglon ABC could be written ∠•ABC; angle ABC could be written ∠ ABC (with arrowheads); and anglex ABC could be written ∠•ABC (with one arrowhead).

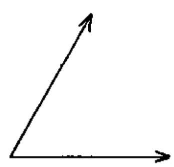


Figure 2
Angle: the union of two rays with a common endpoint.

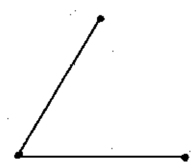


Figure 3
Anglon: the union of two line segments with a common endpoint

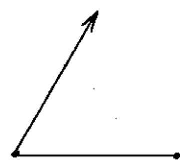


Figure 4
Anglex: the union of one ray and one line segment with a common endpoint.

The addition of these two new terms would allow mathematicians to name these geometric configurations with accuracy and exactness. *(Mr. Elmer Russell is with El Paso Public Schools, El Paso, Texas)* ■

LET'S CHALLENGE THEM

W. A. ASHWORTH, JR.

In the relatively short time I have been teaching I have observed an everwidening conflict over the type mathematics we should offer our students.

Should we encourage almost all of them into a so-called pure mathematics track or should we direct more of them toward the numerous types of basic mathematics programs? Should we exert more pressure to direct our students, or should we accept the popular idea of permissiveness in education?

Perhaps the greatest area of problems is in determining which of our ninth grade students should take Algebra and which should take Related Mathematics. Originally, Related Mathematics was designed for about 20% of our students. Now, according to all indications, we have upward of 35% in Related Mathematics. I suggest there are several reasons for this situation.

First, the students are misinformed in the eighth grade. I have been told by many students that they have been told by principals and counselors, as well as arithmetic teachers, they should not take Algebra in the ninth grade if they do not have an "A" in eighth grade arithmetic. Worse than this, some arithmetic teachers do not encourage any of their students toward Algebra. Some of these misplaced students can be found in the first few days of school and redirected. Unfortunately, too many are not found soon enough to do this.

Second, there is too little communication between arithmetic teachers and high school teachers. We bemoan our problems in too many areas except those where something can be done to correct them. There should be interchange of ideas and problems to help thes studnts in their transition to high school. Failing to do this makes our students the losers.

Third, we are not selling our total program. Students, for the greatest part, tend to sink to the lowest level of effort. Unless we sell our program, there is an inevitable consequence – the students take the "easy courses" wherever possible. In a recent curriculum assembly in our school, students were asked "How many of you who are taking Related Mathematics plan to go to college?" The response was alarming! Almost half of the students in these courses indicated such intention. To be sure, many will not go to college, but the regretful part is that some will go to college grossly unprepared in mathematics.

Fourth, and this embodies much of our problem, we are not challenging our students. Sometimes, I agree, this seems to be an almost insurmountable task, but we must try harder. This year I am teaching a Related Mathematics I class. They were in no way hand picked; they were in every way a typical class. We decided to try teaching them Algebra I. Our progress has been very slow – but there has been progress. I would like to share with you some of the things I have learned from this class.

Patience in abundant amounts is imperative. These students sense they have been, and are, failures in mathematics. They sense quickly any expression of frustration or displeasure from the teacher. Sometimes patience is almost impossible, but it can be found. At least, I have, and that is quite an accomplishment.

Praise the students for any success however small. I think it would be a good idea to have some type of progress chart for these students — even using gold stars might work to great advantage.

Accept as a guiding principle that maintaining these students' attention and interest in a particular topic for more than a few days is unlikely. Be prepared to move to a new topic when interest wanes. It may be necessary to go back to one topic several times in order to complete it. This is a new approach to "spiral teaching," but it works.

Be adventuresome and try new approaches and methods with these students. If they are a part of your adventure, most of them will rise to the occasion and cooperate.

To be sure, these ideas are directed toward Related Mathematics students, and this is not the only area where problems exist. I suggest some of the ideas will work whatever the level of subject matter if we are willing to use them. The most important part is in challenging our students.

LET'S CHALLENGE THEM! *(Mr. W. A. Ashworth, Jr. teaches at J. Frank Dobie High School, Pasadena Independent School District)* ■

METROPOLITAN HOUSTON AREA COUNCIL OF TEACHERS OF MATHEMATICS

BELA WADE

Within the past year a rather unique mathematics council, The Metropolitan Houston Area Council of Teachers of Mathematics, has been formed. Its uniqueness lies in the fact that its chief function is that of sponsoring and coordinating joint activities of the local N.C.T.M. affiliated groups – The Gulf Coast, Houston, San Jacinto, and Spring Branch Area Councils of Teachers of Mathematics. The membership of this coordinating council consists of local school mathematics supervisors, and presidents and program chairmen of the math councils in the greater Houston and Gulf Coast area.

Under the leadership of Mrs. Velma Dickerson, Waltrip High School (Houston), two major activities for the year were undertaken. In September, 1970, a math conference, held at Houston Baptist College and keynoted by Dr. Ruth Hoffman, University of Denver, attracted some 500 teachers and provided outstanding seminars, workshops, and exhibits for those attending. In January, 1971, some 30 schools and over 700 students participated in a gigantic Mu Alpha Theta conference and contests sponsored by the Metropolitan Council. Since these activities were very successful, they have been selected as permanent projects for the Council.

At a recent meeting of The Metropolitan Area Council, officers for the ensuing year were elected and plans were made for the September Conference. R. D. Thomas, Aldine Schools, will serve as General Chairman; Bela Wade, Galena Park Schools, Secretary; and Arthur Mittelsteadt, Spring Schools, Treasurer. Chairmen were appointed for various activities of the fall meeting. Those named included Anne Wood and Pat Echols of Spring Branch Schools; Thelma Hannerling, Velma Dickernson, and Doris Hild of Houston Schools; and James E. Carson of Pasadena Schools. Mr. Carson, President of Texas Council of Teachers of Mathematics, reviewed proposals and future plans of T.C.T.M. New members of The Metropolitan Area Council include Charlene Khohlmaier, Adele Jiral, and Shirley Cousins. *(Mrs. Bela Wade is Coordinator of Mathematics in The Secondary Schools at Galena Park, Texas)* ■

Computer Quiz

Test your knowledge of the data processing field by answering the following questions. Upon completion of quiz, refer to answers on page 11.

1. A graphic version of a program in which symbols are used to represent operations is a ______________.
2. A computer's programs, plus the procedure for their use is called_______.
3. The automatic identification and classification of shapes, forms, or relationships is__________ ________________.
4. An electronic device capable of accepting information, performing mathematical and logical operations on it, and reporting the results is a ____________.
5. The physical equipment or devices forming a computer and peripheral equipment is called _____________.
6. The preparation of source media which contains data or basic elements of information, and the handling of such data according to precise rules of procedure to accomplish such operations as classifying, sorting, calculating, summarizing and recording is ________ _____________.
7. A symbolic way of stating a problem in terms of YES or NO decisions is called ___________ ___________.
8. Auxiliary, Peripheral, CPU and Communication are the four major categories of_______________________.
9. The most commonly used form of computer memory is ____________ ____________ ________________________.
10. Define CAI and CMI.
11. The recovering of desired information or data from a collection of documents or other graphic records is___________ ________________.
12. The originator of punched cards was _________ ________________.
13. A popular method of arriving at a best strategy when the factors are proportionally related is ______ ______________________.
14. What must a programmer know before he can code a program? ____ ____
15. A programming language designed for problems which can be expressed in algebraic notation, allowing for exponentiation and up to three subscripts is known as________________________.

NEWS FROM HOUSTON ISD

C.A.R.E. (Computer Appreciation a Resource for Education)

At the suggestion of representatives from the Computer Science Departments of Rice University of Houston, the Mathematics Department of Houston ISD has introduced a two-week computer appreciation unit into the curriculum for all the eighth grade classes in the district. The tentative curriculum for all the eighth grade classes in the district. The tentative curriculum guide has been prepared by Mrs. Dorothy Leach of Westbury Senior High School. Mrs. Leach has taught computer applications to junior high students, served as Coordinator of the HISD Title III Computer Project, and has been employed by a commercial time-sharing company. She is currently teaching Computer Science at Westbury.

The primary objective of the unit is for students to gain an appreciation of the influence of computer technology upon society, including an awareness of the problems generated by widespread computer usage. The secondary objectives are to learn how a task is structured for computer processing and how to write a simple program. An evaluation of the program will be made by the teachers as to the effectiveness of the unit in aiding students to broaden their understanding of computers and their usage, as well as motivating students to explore and research on their own.

C.A.R.E. is designed to involve the students actively by having them make posters, build projects, give reports, take field trips and write programs. The teacher uses a variety of teaching aids such as films, film loops, records, slides and tapes. Guest speakers from local companies have added variety to the program. One activity that the students enjoy is simulating a computer. The article "A Student Computer That Really Works" in *The Mathematics Teacher*, NCTM, December, 1970, describes this activity. The last few days of the unit are spent in flow charting and programming in the BASIC language.

In addition to the two-week computer appreciation unit, a short unit in computer assisted mathematics has been prepared to introduce the use of a time-sharing computer terminal for solving junior high school mathematical problems. A portable terminal was placed in eight selected junior high schools for a three-week duration. Eighth grade students in these schools had use of the RCA Spectra 70 at the Region IV Computer Center through "hands-on" use of the terminal. The students were encouraged to write original programs for solutions of problems encountered in their regular eighth grade mathematics curriculum. ■

TRADING GAME

LYN McLANE

Objectives: To give children informal experience involving place value and regrouping for numbers 1-100.

Grade Levels: K-6. This game is excellent from Kindergarten on up to sixth grade because the rules can be changed to meet the needs of the children playing. It is strongly recommended that teachers have this game available to the children well before any discussion of place value or operations including regrouping. By playing the game, the children gain an intuitive feeling for place value so that when the times comes to discuss it in a formal way, they already have the background experience for better understanding.

Materials:

1. Cuisenaire rods – 10 oranges and 20 whites for each player.
2. Pair of dice (or cubes with a numeral on each face).
3. Square of orange oak tag – 10 cm. by 10 cm.

Number of players: 3 to 5 children.

Rules:

1. Establish which child is going to be the banker.

   That child takes all the Cuisenaire rods and the oak tag squares.
2. The child to the left of the banker starts by throwing the dice and counting the dots (or adding the numbers) on the two top faces. He asks the banker for that many white rods.
3. When a child gets 10 whites he must give them to the banker in trade for an orange rod.
4. The play continues with the children taking turns in a clockwise direction.
5. Ten orange rods must be exchanged for an oak tag square.
6. The *winner* is the child who gets the oak tag square.
7. The winner becomes the new banker and another game is started, if time permits.

Variations:

1. Change the numerals on the dice for easier or harder problems.
2. Multiply, instead of add, the numbers on the dice.
3. Change the goal from one oak tag square to 2 oak tag squares, to 5 orange rods, to 8 orange rods, etc.
4. Use 3 dice and add all the numbers or multiply two numbers and add on the third.
5. Let each player start with an oak tag square and subtract the sum of the numbers on the dice. The *winner* is the first child who runs out of rods. (Note: Each child will have to trade the oak tag square for 10 orange rods and then trade an orange rod for 10 whites as needed.)
6. Make up your own variations.

(Editor's note)

Lyn McLane received her B.A. in mathematics from Smith College, Northampton, Mass. M.Ed. from Harvard University.

She is a member of the S.M.S.G. Advisory Board and is on the N.C.T.M. Board of Directors.

She has teaching experiences at all levels and has served for 4½ years as Elementary Mathematics Specialist in Lexington, Mass. ■

ANSWERS TO COMPUTER QUIZ ON PAGE 8

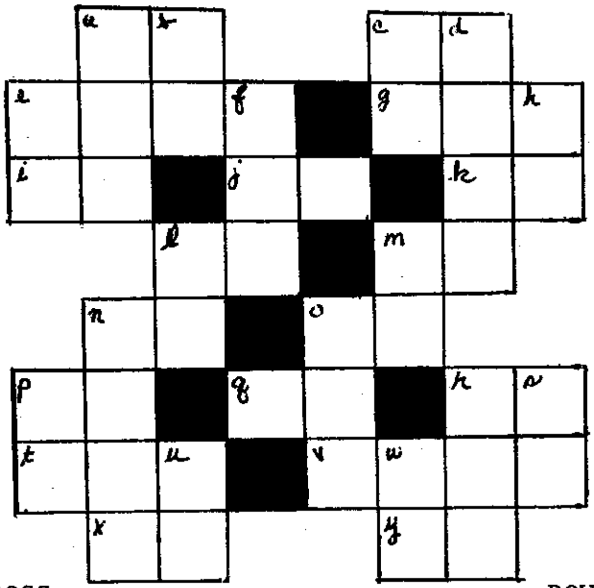
ON PAGE 8

1. Flowchart
2. Software
3. Pattern Recognition
4. Computer
5. Hardware
6. Data Processing
7. Boolean Logic
8. Hardware
9. Magnetic Core Storage
10. Computer-Assisted Instruction
    Computer-Managed Instruction
11. Information Retrieval
12. Herman Hollerith
13. Linear Programming
14. Overall job description
    Output desired (format and content)
    Input required
    Processing specifications
15. FORTRAN

TELL IT LIKE IT IS By DUNAGIN

"Bartenders replaced by computers? Who'd want to tell his troubles to a computer?"

GENERAL REVIEW OF ALGEBRA



ACROSS

a. Root of 3x+2 = 80
c. Right member of 6y = 93
e. $(a-1)^2$ when a = 40
g. $300 + 5 \cdot 6 - 3^2$
i. $\sqrt{784}$
j. $A = \frac{1}{2}bh$. Find b if A is 91 and h is 7
k. $7 \cdot 8 + 12 \div 6 - 4$
l. Root of .7 + .8 = 24.6
m. 3:13 = x:117. Find x.
n. Root of $\frac{5}{6}c = 14 + \frac{1}{2}c$
o. Ordinate of point (8,15)
p. $(a^2)^3 + 13a$ when a = 2
q. Positive root of the equation $b^2 - 16b = 36$
r. $3\sqrt{2} \cdot \sqrt{32}$
t. $c^3 - 3c$ when c = 6
v. $(x-90)^2 - x^2$ if x = 4
x. Root of $\sqrt{n-5} = 3$
y. $\sqrt{a^6} + 4\sqrt{3a}$ when a = 3

DOWN

a. Digits whose sum is 15
b. (-5)(-12) -7+9
c. $9 \cdot 12 - 8 \cdot \frac{1}{2} - 11$
d. Prime factors of 210
e. Root of 3x-5 = x+19
f. $\sqrt{15,376}$
h. Positive root of the equation $x^2 - 11x = 42$
l. Root of $\frac{2}{3}(a+4) = \frac{3}{4}a$
m. $24 \div 6 + 2 \cdot 9 + 3$
n. $(x^3)^2$ when x = 4
o. $\frac{5^4 - 4^3}{2^2 - 1^3}$
p. $a^2 + a + 1$ when a = 9
r. $(y + 2)^2$ when y = -19
s. Positive root of the equation $y(y-38) = 80$
u. $3^2 \cdot \sqrt{100} + 4(-3) + 6$
w. $C = \pi d$. Find C if π is 3 and d is $10\frac{1}{2}$

GLOSSARY OF MATHEMATICAL TERMS

NOTE: It is hoped that this list will contribute to your better understanding of the ***MATH TERMS.***

NUMBER LINE: ____ mathematical hop-scotch
BASE FIVE: ____ 1 plus 4 – 10
SET: ____ what you do in the chair
SUBSET: ____ what you do under a chair
PROPER SUBSET: ____ sitting straight under a chair
EMPTY SET: ____ someone is absent
DISJOINT: ____ place where truckdrivers eat
VENN DIAGRAM: ____ the funnies
ELEMENT: ____ large animal with a trunk
UNION: ____ suit with a trap door
SYMBOL: ____ parts of brass band
ONE-TO-ONE CORRESPONDENCE: ____ letters to Santa Claus
INTERSECTION: ____ schools in the South
INTEGERS: ____ bussed-in children from out of district
ABACUS: ____ Chinese rosary
ALGORISM: ____ fairy tales with numbers
ARRAY: ____ Christmas vacation
RECIPROCAL: ____ unfair exchange
BINARY: ____ two-headed canary
CLOSURE: ____ last day of school
COMPLEMENT: ____ when somebody busy the same clothes you wore last week
WHOLE NUMBERS: ____ fire drill
RATIONAL NUMBERS: ____ four day week
IRRATIONAL NUMBERS: ____ parent with a complaint
INFINITE NUMBER: ____ children in your class
IMAGINARY NUMBER: ____ gross pay
COMPLEX NUMBER: ____ net pay
COMMUTATIVE: ____ block party
ASSOCIATIVE: ____ someone you can do without
DISTRIBUTIVE: ____ spot reducing
NEGATIVE: ____ no parking
POSITIVE: ____ parked cars will be towed away, or your chest X-ray
IDENTITY ELEMENT: ____ driver's license
UNIQUE: ____ employee number
UNIVERSE: ____ poems for "in" groups
FRACTION: ____ broken bones
NUMERATOR: ____ works for telephone company
DENOMINATOR: ____ speaker at the convention
PRIME FACTOR: ____ Max
PLANE: ____ not fancy
POLYGONS: ____ young frog
CONGRUENT: ____ Senate and House Reperesntative
CUBE: ____ small cucumber
SPHERE: ____ extreme, as a sphere pain
POINT: ____ something you eat
AXIOM: ____ gulliotine
PROOFS: ____ excuses from home
CASTING OUT 9's: ____ benching a baseball or softball team
DIVISIBILITY: ____ zero on a foggy day
RADIUS: ____ television without a picture
UNION DIGIT: ____ trailer hitch

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N O W ! !

COMING EVENTS–

September 25, 1971 (Tentative Date) Greater Houston Metropolitan Area, Houston Baptist College

October 7-9, 1971 NCTM Name-of-Site Convention, Oklahoma City, Okla.

October 7-9, 1971 CASMT, Austin, Texas

October 23, 1971 TCTM Workshop, J. Frank Dobie High School, Pasadena ISD

February 10-12, 1972 NCTM Name-of-Site Meeting, Beaumont, Tex.

TEXAS MATHEMATICS TEACHER
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