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IN THIS ISSUE

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MISSION: To promote mathematics education in Texas

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* Maintain journal quality
* Support CAMT
* Increase scholarship funding and awards, including CAMTerships
* Communicate better among board members and affiliated groups.
* Maintain website
* Support affiliated group conferences by advertising in journal and on website
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* Continue to maintain TCTM booth at CAMT

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Texas Mathematics Teacher

LONE STAR NEWS

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Texas Mathematics Teacher, the official journal of the Texas Council of Teachers of Mathematics, is published in the fall and spring. Editorial correspondence and manuscripts should be mailed or e-mailed to the assistant editor.

All readers are encouraged to contribute articles and opinions for any section of the journal.

Manuscripts, including tables and figures, should be typed in Microsoft Word or Works. Submit four copies and an IBM formatted 3 1/2 inch diskette containing the manuscript or send as an e-mail attachment to assistant editor.

Articles for *Voices From the Classroom* should be relatively short. A discussion of appropriate grade level and prerequisites for the lesson should be included.

Items for *Lone Star News* include, but are not limited to, TCTM affiliated group announcements, advertisements of upcoming professional meetings, and member updates.

Businesses interested in placing an **advertisement** for mathematics materials should contact Paul Kennedy.

Letter from the President

Howdy to all mathematics educators and friends of mathematics education! Wow! It's been interesting serving as TCTM president. So many things are going on in mathematics education in Texas and nationwide. I have represented TCTM at several meetings in Austin concerning the new Mathematics Initiative and CAMT 2001. Here's what's happening.

The proposed Mathematics Initiative is going to bring big changes to mathematics education in Texas. Governor Perry is modeling the Initiative after the successful Texas Reading Initiative. He has stated five proposals for the Initiative which are:

- Proposal 1: Appoint a working committee on excellence in math education;
- Proposal 2: Utilize technology to provide training modules for math instruction and on-line diagnostics tests to measure student progress;
- Proposal 3: Establish math academies to train teachers in proven, research-based instructional techniques;
- Proposal 4: Expand the master teacher program to recruit, retain, and reward highly-trained math teachers; and
- Proposal 5: Provide intensive instruction and remediation to at-risk students to improve math skills.

The proposals are included in bill TX77RHB 1627 and will be voted on this spring. I am excited about the Mathematics Initiative and believe it will help improve both instruction for students and student achievement as well as encourage more people to become mathematics educators.

CAMT 2001 will be held in San Antonio from July 19-21. There will be pre-sessions before and an administrator's conference during the conference. You will be receiving the program book soon, and please encourage other teachers at your schools to attend. I am responsible for assigning volunteer workers for CAMT. Volunteers assist with on-site registration and manage the NCTM/TCTM booth in the exhibit hall. Without volunteers, the conference is not possible. The CAMT Board of Directors, Program Chairs, and most speakers are all volunteers. The volunteer form is on p. 21, in the CAMT 2001 program book, and on the TCTM website. Please recruit volunteers and send the forms to me. You also will find the TCMT Ballot on p. 39. We have a wonderful slate for candidates, so please remember to vote.

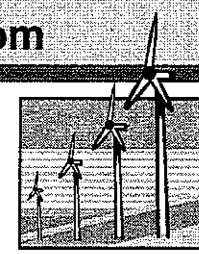
Several awards are given each year by TCTM at CAMT. We give three graduating high school seniors who plan to pursue a career in mathematics education $1000 scholarships. Also, the E. Glenadine Gibb Achievement Award and the TCTM Leadership Award are given at the Friday luncheon. We have extended the deadline for CAMTership Awards until May 15, 2001, and they are for six first-time CAMT attendee teachers who have been teaching five or fewer years and are TCTM members. Application forms begin on p. 30. Please encourage people to apply. Last but not least, please plan to attend our annual business meeting and breakfast to be held Saturday, July 21 at CAMT. The door prizes are great and so is the price. See p. 26 for the form. If you have any questions, feel free to call me at 210-458-5851 or e-mail me at kmittag@utsa.edu Hope the rest of your school year goes well and see you all at CAMT.

Sincerely

Kathy

Kathleen Cage Mittag, TCTM President 2000-2002

A Standards-based Approach Toward Teaching Proportional Reasoning in the Middle School Classroom



Dr. Bill Jasper, Assistant Professor, Sam Houston State University
Chris Johnson, Eighth-Grade Mathematics Teacher, Jacksonville ISD

BACKGROUND

Proportional reasoning is one of the most important strands in middle school mathematics curriculum. In fact, the original NCTM Standards (1989) stated that the ability to reason proportionally is "of such great importance that it merits whatever time and effort that must be expended to assure its careful development." Emphasis on proportional reasoning has not diminished since 1989. The new NCTM Principles and Standards for School Mathematics (2000) state that "foundational ideas like place value, equivalence, proportionality, function, and rate of change should have a prominent place in mathematics curriculum because they enable the students to understand other mathematical ideas and connect ideas across different areas of mathematics." These key foundational ideas can be developed to a high level over a period of time with many diverse activities, where students are actively engaged in meaningful tasks. Without deep understanding of these key concepts, future mathematical understanding and development of real-world mathematical skills will be hampered.

Precursor understanding of the proportionality construct begins in the early-to-middle elementary grades, when students learn about rational numbers, fractions, and ratios. Behr, Harel, Post, and Lesh (1992) provided an excellent analysis of research conducted in these areas. Of particular interest to this article are the authors' conclusions regarding the distinction between qualitative and quantitative proportional reasoning. Whereas quantitative (numerical) reasoning enables students to solve some proportion problems using memorized procedures or algorithms, qualitative reasoning is more important. Expert problem-solvers reason qualitatively before they reason quantitatively - they analyze relationships and interactions among problem components before actually solving the problem numerically. Every seventh and eighth grade mathematics teacher has encountered students who are successful at setting up proportions and calculating answers to problems (quantitative reasoning), but do not have an intuitive feel (qualitative reasoning) for whether their answers should be more, less, or the same compared to what value they had initially. Students often lack the ability to decide whether their solution is reasonable or not. For example, if a 12-foot tree casts a 6-foot shadow, how tall is a tree that has a 10-foot shadow? Students who insert numbers into an equation without thinking qualitatively about the relationship described may arrive at an answer of 5 feet for the height of the tree. However, a student who demonstrates qualitative proportional reasoning would understand that the tree height in this case must be greater than (or even better, twice) the shadow's length, and therefore would be looking for a larger answer than 10 feet. Unfortunately, many middle school students do not have a good understanding of proportionality and often rely solely on memorized procedures.

Why do we need to teach our students qualitative proportional reasoning? The most important justification is that students need to be able to reason mathematically as a prerequisite for entering the workforce in the 21st Century, an idea that is solidly supported by the NCTM Standards documents (1989, 2000). In Texas, passing rates on Texas Assessment of Academic Skills (TAAS) tests also receive high level emphasis by state and district administrators, as well as by parents, teachers, and students themselves. At the middle school and high school levels, proportionality problems are a significant portion of the TAAS tests. Although TAAS scores are good, the Algebra 1 End-of-Course (EOC) Exam state passing rates were only 45 percent for the Spring 2000 testing cycle (for detailed information and actual tests administrated, see the Texas Education Agency's website, www.tea.state.tx.us). A sample problem (#37) on the spring, 2000 Algebra 1 EOC test was:

> The number of pieces of mail processed by a machine in the post office is directly proportional to the number of minutes that the machine runs. The machine processes 2700 pieces of mail in 60 minutes of continuous running. How many pieces of mail would the machine process in 25 minutes of continuous running?

This problem is a relatively easy proportion problem, especially since students can use calculators on this test. In addition, other problems on this test involve finding an equation for a function that is represented by data in graph or table format. Qualitative proportional reasoning definitely aids a student when finding solutions to these types of problems. Since Texas students will also have to pass the new eleventh-grade TAAS exit-level test (which will include Algebra 1 and Geometry knowledge, beginning with the Class of 2005), it is imperative that we improve our students' mathematics understanding of proportionality at the middle school level. From the experiences of the authors of this article, success in Algebra 1 depends mostly on how well a student truly understands the concepts of proportionality, fractions, equations, and functions.

Despite the fact that the NCTM Standards (1989) have been published for over 10 years, learner-centered, constructivist mathematics lessons are not seen often in many middle school classrooms in Texas. Over the past two years, 15 mathematics classrooms (grades 5 and 6) were visited on a weekly basis, as part of a field-based internship program for prospective elementary teachers. The normal class lesson included teacher lecture, worksheets, and memorization of procedures or rules to solve problems. These teacher-centered lessons were even more prevalent in the spring semester, due to the impending TAAS tests. A recent study (Ben-Chaim, D., Fey, J., Fitzgerald, W., Benedetto, C., and Miller, J., 1998) analyzed the effectiveness of using a problem-solving, cooperative teaching approach versus a traditional textbook algorithmic approach. The authors found that students in the first group "dramatically outperformed" the textbook group in solving proportional problems involving rate. The students in the non-textbook group were not taught specific algorithms but were given proportion problems to solve that were presented in a "story" or word problem format, and they worked together to develop strategies for solving the problems. These students were able to reflect, verbalize, and solve proportion problems at a much higher level than the textbook group.

So, how do teachers learn to teach hands-on, learner-centered mathematics lessons that emphasize concept development rather than memorization of rules and procedures? Texas has recently implemented an excellent professional development program for mathematics teachers, called TEXTEAMS, which does exactly that.

TEXTEAMS

The Texas Teachers Empowered for Achievement in Mathematics and Science (TEXTEAMS) is a statewide program that is considered the backbone of the state's effort to raise every student's mathematical and scientific knowledge and achievement in the state of Texas. The Texas Statewide Systemic Initiative (Texas SSI), a part of the Charles A. Dana Center and the University of Texas at Austin, has created a TEXTEAMS Institute titled "Rethinking Middle School Mathematics: Proportionality Across the TEKS for grades 6-8". One of the authors of this article had the privilege of participating in this five-day institute in July 2000, which "stretched and extended" the level of the mathematical knowledge of all attendees. Teachers left the institute with a deeper understanding of proportional relationships and situations, which will help guide students to a better conceptual knowledge of proportionality. TEXTEAMS institutes include the appropriate use of manipulatives and technology and the use of "non-traditional" procedures for working proportional problems. Teachers will be able to take these ideas back to their classrooms and adapt them to the needs of their students, because they will have worked through the activities themselves.

The activities in TEXTEAMS institutes model the way mathematics should be taught, supporting the NCTM Principles and Standards (2000). Each lesson fully explores a concept by using manipulatives, technology, and discussion and looks at the concept from many different representations. Proportionality is represented with words, manipulatives, pictures, graphs, tables, symbols, and equations. This in-depth study allows the teacher to gain a complete understanding of the concept of proportionality, along with the many ways to solve and represent proportional situations. TEXTEAMS institutes also provide teachers with connections between proportions and other strands in the mathematics curriculum, such as geometry, measurement, probability, and percent. When students "see" these connections, they will better understand that proportional reasoning is not an isolated mathematical skill, but one of the many tools they can use to solve problems.

One of the TEXTEAMS activities for developing proportional reasoning is called "American as Polygon Pi." This activity is an extension of the concept of pi and can easily be adapted to the sixth or seventh grade classroom. In this lesson the students work with regular polygons and measure the longest diagonal and the perimeter and then examine the ratio of the perimeter to the diagonal. The students first start with squares and then move to pentagons, octagons, and then to greater-sided regular polygons, depending on the technology available. As the students do this, they soon discover that as the number of sides increases, the ratio approaches pi. After each shape is constructed (four of each polygon) with either hinged mirrors or with computer software and the measurements are recorded, students are challenged to explain if the shapes are similar, find the scale factor between two shapes, and explain if a proportional relationship exists. The students are also asked to plot the ordered pairs (diagonal, perimeter) for a graphical representation of the proportional relationship and to use the graph to make predictions. These activities help students to clarify the definition of similarity and the meaning of proportional relationships. The activity can also help the students by de-mystifying the concept of pi and by exploring the idea of a limit, which they will encounter in high school. In addition, this activity develops the concept of proportionality by integrating different strands of mathematics including geometry, algebra, and calculus, as well as the appropriate use of technology.

TEXTEAMS institutes for professional development training are also available for other mathematics and science concepts. For middle school teachers, there are also TEXTEAMS institutes for numerical and algebraic reasoning. Other mathematics (and science) institutes are available or are currently being developed for grades K - 2, grades 3 - 5, and high school courses. TEXTEAMS mathematics institutes are normally five-day programs. They are offered in conjunction with the Conference for the Advancement of Mathematics Teaching (CAMT), at Regional Service Centers throughout the year, or by contracting a TEXTEAMS leader to present the institute for several teachers. For additional information and training dates, interested teachers should visit The Dana Center website at www.utdanacenter.org/ssi/projects/texteams.

CONCLUSION

Proportional reasoning is a key concept for students to master at the middle school level, and students who are allowed to construct deep understanding of proportionality are very likely to be successful in high school mathematics courses. Teachers in Texas need to develop their own understanding of key mathematical concepts like proportionality in order to best challenge and excite their students in the classroom. The TEXTEAMS institutes are an effective means to improve the content knowledge and instructional practices of teachers in the state of Texas. Only when teachers are both knowledgeable and willing to establish learner-centered classrooms will the NCTM Principles and Standards (2000) be implemented in Texas.

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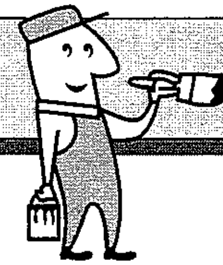
A Proportion Problem Informs Teaching and Learning



Rick Billstein, Jim Hirstein, and Jonny Lott
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Proportions and proportional reasoning are fundamental concepts for middle school students and to prospective middle school teachers. The *Principles and Standards for School Mathematics* (*Principles and* Standards) (NCTM 2000) includes the following in the Number and Operations Standard for Grades 6-8: "In grades 6-8, all students should understand and use ratios and proportions to represent quantitative relationships" (p. 214). In particular, the *Principles and Standards* indicates that, "Facility with proportionality involves much more than setting two ratios equal and solving for a missing term. It involves recognizing quantities that are related proportionally and using numbers, tables, graphs and equations to think about the quantities and their relationship. Proportionality is an important integrative thread that connects many of the mathematics topics studied in grades 6-8." (NCTM 2000, p. 217)

Not only is proportionality important for middle school students, Standard 2 for Professional Development: Knowing Mathematics and School Mathematics, of the *Professional Standards for Teaching Mathematics* addressed the importance of teachers' knowledge of the school mathematics curriculum as follows:

> Too often, it is taken for granted that teachers' knowledge of the content of school mathematics is in place by the time they complete their own K-12 learning experiences. Teachers need opportunities to revisit school mathematics topics in ways that will allow them to develop deeper understandings of the subtle ideas and relationships that are involved between and among concepts. (NCTM, 1991 p. 134)

In several university Mathematics for Elementary Teachers classes, the problem described below provided an opportunity for action research on the understanding of proportionality of prospective teachers. A study of the problem not only revealed student thoughts used in solving proportionality problems, it gave instructors insight into the learning processes being used. The problem follows:

A Classroom Problem

Two painters can paint 3 houses in 5 days. How long would it take 4 painters to paint 15 houses if all work was done at the same rate?

This was the first problem students encountered that involved three different units, namely *houses*, *days*, and *number of painters*. Students had used proportions for problems with two variables, so they decided to set up proportions for this problem. They were careful to keep the same units in the same relative position in the proportion. Although many arrangements of variables are possible, all students set up one of the following two proportions:

Proportion 1

$$\frac{\frac{2 \text{ painters}}{3 \text{ houses}}}{5 \text{ days}} = \frac{\frac{4 \text{ painters}}{15 \text{ houses}}}{x \text{ days}}$$

Proportion 2

$$\frac{2 \text{ painters}}{\frac{3 \text{ houses}}{5 \text{ days}}} = \frac{4 \text{ painters}}{\frac{15 \text{ houses}}{x \text{ days}}}$$

The students decided that both of these proportions should be correct and should yield the same answer because the units were in the same relative positions. However, their computations revealed two different results:

Proportion 1

$$\frac{\frac{2}{3}}{5}=\frac{\frac{4}{15}}{x}$$

$$\frac{2}{3}x=5\bullet\frac{4}{15}$$

$$\frac{2}{3}x=\frac{20}{15}$$

$$30x=60$$

$$x=2$$

Proportion 2

$$\frac{2}{\frac{3}{5}}=\frac{4}{\frac{15}{x}}$$

$$2\bullet\frac{15}{x}=\frac{3}{5}\bullet 4$$

$$\frac{30}{x}=\frac{12}{5}$$

$$150=12x$$

$$12.5=x$$

Students were surprised that two different answers were obtained and were asked to discuss which answer, if either, was reasonable. They agreed that the solution of 2 days was not reasonable and that 12.5 days was a possible solution. Next, the students analyzed why the answers were different. They found that what they were really comparing was whether the following equations were equivalent.

Equation from Proportion 1

$$(2\div 3)\div 5=(4\div 15)\div x$$

Equation from Proportion 2

$$2\div(3\div 5)=4\div(15\div x)$$

They concluded that these equations were not equivalent and that determining the equivalence was related to checking whether the associative property holds for division. Students knew from past lessons that division was not associative, but they failed to recognize it in this context.

Other Questions

Students were then asked to explore the following questions:

1. *Are there other ways that the proportions could be set up?*
2. *Which proportions, if any, are equivalent to each other?*
3. *Which of the proportions yield a correct answer?*

Other ways of setting up the proportion were found by varying the order of comparisons within the ratio. Students found that order makes a difference within a ratio: *houses per painter* is not the same as *painters per house*. Further, they found that either order could be compared (as a ratio) with the number of *days* a job takes. The proportions derived from these ratios are summarized in Column A of Table 1. Because the solutions are different, they found that the answers in Column B could not both be correct. In addition, they found that the reciprocal of each of these ratios (shown in Column C) yielded another ratio with respective equivalent solutions.

Table 1: Student Work

Column A		**Column B**		**Column C**
Ratio	Proportion	Solution	Reciprocal	Proportion
houses per day / days	$\frac{\frac{3}{2}}{5}=\frac{\frac{15}{4}}{x}$	$x=12\frac{1}{2}$	days / houses per painter	$\frac{5}{\frac{3}{2}}=\frac{x}{\frac{15}{4}}$
painters per house / days	$\frac{\frac{2}{3}}{5}=\frac{\frac{4}{15}}{x}$	$x=2$	days / painters per house	$\frac{5}{\frac{2}{3}}=\frac{x}{\frac{4}{15}}$

More investigation led to other orders of comparison with other proportions: *painters per day* compared with *houses*, and *days per painter* compared with *houses*. The results of these proportions are summarized in Table 2 with two solutions, one of which is a repeat from Table 1 but the other is new. As before, the reciprocals of these ratios gave equivalent solutions.

Table 2: More Student Work

Column A		Column B	Column C	
Ratio	Proportion	Solution	Reciprocal	Proportion
$\frac{\text{painters per day}}{\text{houses}}$	$\frac{\frac{2}{3}}{5}=\frac{\frac{4}{x}}{15}$	$x=2$	$\frac{\text{houses}}{\text{painters per day}}$	$\frac{3}{\frac{2}{5}}=\frac{15}{\frac{4}{x}}$
$\frac{\text{days per painter}}{\text{houses}}$	$\frac{\frac{5}{2}}{3}=\frac{\frac{x}{4}}{15}$	$x=50$	$\frac{\text{houses}}{\text{days per painters}}$	$\frac{3}{\frac{5}{2}}=\frac{15}{\frac{x}{4}}$

The students found two more possibilities: *days per house* compared with *painters* and *houses per day* compared with *painters*. Table 3 shows these ratios and their reciprocals gave two previous solutions.

Table 3: More Student Work

Column A		Column B	Column C		
Ratio	Proportion	Solution	Reciprocal	Proportion	Solution
$\frac{\text{days per house}}{\text{painters}}$	$\frac{\frac{5}{3}}{2}=\frac{\frac{x}{15}}{4}$	$x=50$	$\frac{\text{painters}}{\text{days per house}}$	$\frac{2}{\frac{5}{3}}=\frac{4}{\frac{x}{15}}$	$x=50$
$\frac{\text{houses per day}}{\text{painters}}$	$\frac{\frac{3}{5}}{2}=\frac{\frac{15}{x}}{4}$	$x=12\frac{1}{2}$	$\frac{\text{painters}}{\text{houses per day}}$	$\frac{2}{\frac{3}{5}}=\frac{4}{\frac{15}{x}}$	$x=12\frac{1}{2}$

Checking Results

To check the three solutions developed in Tables 1-3, the students considered the following equivalent ratios:

2 painters finish 3 houses in 5 days,

and 2 new painters work at the same rate, 3 houses in 5 days, so

4 painters finish 6 houses in 5 days.

Therefore, those 4 painters would finish 3 houses in 2 1/2 days. Using this information, students reasoned that the 4 painters could paint 15 houses in 12 1/2 days, and so this solution is correct. The other two solutions are not reasonable. Because 4 painters finish 3 houses in 2 1/2 days, they could not finish 15 houses in 2 days. Since 4 painters finish 6 houses in 5 days, they would finish 60 houses in 50 days, and it would not take 50 days to finish only 15 houses.

There are many variations of the equivalent ratio argument to determine the reasonableness of solutions. If one of the elements in the ratio is made to be 1, an estimate of the solution is somewhat easier. In the given problem, students should look for an equivalent ratio involving one painter, one house, or one day. In the problem, because

2 painters finish 3 houses in 5 days, then
1 painter finishes 3/2 houses in 5 days.

Knowing how many houses 1 painter can finish in 5 days makes it easier to estimate how long it would take 1 painter to finish 15 houses, and in turn how long it would take 4 painters to paint 15 houses.

Although 2 days and 50 days are not reasonable answers to the original question, they are solutions to related proportions. What questions might they answer? Because a comparison of *houses per painter* with *number of days* gave a correct solution and

$\frac{\frac{2}{3}}{5}=\frac{\frac{4}{15}}{x}$ implies $x=2$, then 3 painters finishing 2 houses in 5 days and 15 painters finishing 4 houses in x days would have an answer of 2 days.

Similarly, because

$$\frac{\frac{5}{2}}{3} = \frac{\frac{x}{4}}{15} \text{ implies } x = 50,$$

then 2 painters finishing 5 houses in 3 days and 4 painters finishing x houses in 15 days would have an answer of 50 houses.

Conclusions

Analyzing the actions and thinking of preservice elementary teachers shows that they need experience in dealing with ratios and proportion. A simple proportion problem provided an opportunity for them to investigate a variety of issues, including alternative ways to set up a proportion. By investigating incorrect proportions, they found that an incorrect solution to one problem could be a correct answer to a different problem. In addition, students were reminded that when an answer is obtained it needs to be evaluated to see if it makes sense. Examining the thinking and insights of students as they experimented with the original problem and the ensuing problems they created as a result was convincing evidence that using the algorithm of setting up proportions based on keeping units in the same order is not a good way to teach the concept. Knowing what the units in a proportion mean is fundamental to real understanding and requires experiential work by students. This exemplifies the notion that learning an algorithm without understanding is not beneficial.

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Mathematics and Gender: Ending the Stereotypes

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"Stereotyping means making generalizations about people based on commonly held beliefs or societal expectations rather than on actual individual characteristics" (Boland, 1995, p.2). One stereotype claims men are better at mathematics than women. Other myths include unfounded reports of a male "gene for mathematics." Myths of females' innate inferiority in mathematics continue despite research disproving them. Studies show Americans believe the myths, which leads to victims internalizing the beliefs (Zaslavsky, 1994). Also peer pressure reinforces myths like "math isn't for girls" though research has never indicated any female inability to excel in mathematics. In fact, gender differences in mathematics achievement tests are almost negligible (outside of the SAT; which will be addressed later) (Zaslavsky). Since boys and girls are equal in mathematics performance, the under-representation of women in college mathematics courses and math-related occupations must be due to societal and school factors.

Gender differences have been found on the math Scholastic Aptitude Test (SAT). In 1992 the Educational Testing Service examined scores of about 47,000 college students and found males averaged 43 points higher than females on the mathematics portion of the SAT (College Entrance Examination Board [CEEB], 1992). By 1999, females had narrowed the gap to 36 points below the average score of males (National Council of Teachers of Mathematics [NCTM], 1999). This difference is probably attributable to several factors. First of all, college bound students do not make up a representative sample of the population. A disproportionate number of women from low-income families take the SAT and attend college (CEEB, 1992). (This could be because males from low-income families may be more likely to join the military or start work field right after high school [Zaslavsky, 1994].) Typically, children of wealthy parents score higher than those of lower income parents (Zaslavsky). Also, fewer women than men take advanced mathematics courses in high school, though the gap is narrowing. "The preponderance of low-income women with inadequate math backgrounds tends to bring down the average score for women [on the math SAT]" (Zaslavsky, 1994, p. 58). Women do as well as men in college mathematics and science courses (Zaslavsky).

Any difference in math SAT scores has ramifications because it is used as a criterion for college admission and scholarships. The SAT test has been criticized for its timed and multiple-choice format, which may cause some gender differences (Zaslavsky, 1994). Hyde, Fennema, and Lamon (1990) recommend that the math SAT be inspected for gender-biased items that should be eliminated, such as questions that involve sports, which have been shown to produce gender differences (Linn & Hyde, 1989).

Hyde et al. (1990) conducted a meta-analysis on the results of 100 studies on gender differences in mathematics performance and reached several general conclusions. Gender differences in mathematics are small enough to be considered negligible. Females score slightly higher in computation skills at all ages, while males do slightly better in problem solving tasks beginning in high school. In studies where the sample was from the general population, females outperform males by a small amount (Hyde et al.). Like Zaslavsky, Hyde et al. concluded that any gender difference on the mathematics SAT favoring males was due to the selective sample, parental background, and test features. It must be stressed that SAT scores reflect education, background, and test-taking skills, *not* innate ability.

Researchers who believe falsely that SAT scores reflect inherent ability have used gender differences to support sexist theories. Camille Benbow and Julian

Stanley hypothesized in a controversial article in *Science* in 1980 that "[gender] differences in achievement in and attitude toward mathematics result from superior male mathematical ability, which may in turn be related to greater male ability in spatial tasks" (p. 1264). However, two problems with their hypothesis were noted by Schafer and Gray (1981) in an editorial response to this study: Environmental and cultural factors were not ruled out, and it is not clear that SAT scores are a good measure of inherent mathematical ability. Also, because the study was based on the math SAT scores of mathematically precocious youths, the results cannot be generalized to the general population (Hyde et al., 1990). The results of the meta-analysis conducted by Hyde et al., however, demonstrate what is expected when dealing with a normal distribution. Large differences may be found at the tails of a normal distribution even though the difference for the entire population is negligible. Benbow and Stanley's research findings, from an extremely selective sample in the right tail of the distribution, do not support any conclusions about the overall distribution.

The supposed superior spatial ability, alluded to in Benbow and Stanley's (1980) quoted statement above, has been attributed by some researchers to the effect of testosterone on the right hemisphere during prenatal development (Goleman, 1987). However, there is no concrete evidence that testosterone has an influence on brain functioning in the prenatal stage (Zaslavsky, 1994). Differences between boys and girls on spatial tests are relatively small (Skolnick, Langbort, & Day, 1982). Also, spatial ability is not necessarily a prerequisite for good performance in all types of mathematics. In spite of these rebuttals to Benbow and Stanley's conclusion, the controversy generated by their article led Schafer and Gray (1981) to state, "it is virtually impossible to undo the harm that the sensationalized coverage has done" (p. 231).

The development of spatial and mathematics skills is related to the types of learning opportunities provided each gender, *not* innate ability. Research indicates that gender-role socialization is the major deterrent to the development of girls' spatial abilities (Skolnick et al., 1982). Toys also reinforce gender-role stereotypes. Teen Talk Barbie caused a stir by saying "Math class is tough." Mattel later eliminated that phrase after numerous complaints (Zaslavsky, 1994). "The labeling of math and science as masculine inhibits girls' interest, motivation, participation, and success" (Skolnick et al., p. 34). Also, parents' gender role expectations can lead them to encourage traits that fit stereotypes in their children. In a long-term study of 1500 seventh grade children, many mothers tended to consider mathematics too difficult for their daughters and discouraged them from taking advanced math courses (Zaslavsky). For these reasons, intervention to offer alternative views to the stereotypes needs to occur during elementary years. Boys especially need to be targeted since they are more prone to hold such views and because negative male peer pressure could hurt a girl's positive attitude toward mathematics (Boland, 1995).

The education system is also influenced by stereotypes and sexist theories about the supposed mathematical inferiority of women. "Does the school system really give everyone an equal opportunity, regardless of gender, race, language spoken at home, or social class? Of course not, and that disparity is a source of math fear and avoidance. Math classes are conducted differently for different groups, starting from the earliest grades" (Zaslavsky, 1994, p. 24). Course scheduling may also be gender biased. At my rural high school during my senior year in 1985, the only section of precalculus was offered at the same time as the senior home economics course. The unspoken implication was that a young woman would not be interested in both courses.

Sexist reports like that by Benbow and Stanley (1980) propagate myths that can affect educational policy. The Equal Opportunities in Science and Technology Act was supported by Senator Edward Kennedy and signed by President Carter on December 12, 1980 (Schafer & Gray, 1981). Advocates of this legislation to provide equal opportunities for women in science were told by opponents it would be a waste of money because women are genetically inferior in math (Schafer & Gray). In spite of such appalling views, by the late 1980s women were catching up to men in number of mathematics courses taken, due in part to more stringent high school requirements (Zaslavsky, 1994). Back in 1972 at the University of California at Berkeley, Sells (1978) surveyed entering freshmen and discovered that 57% of the males, but only 8% of the females, had the mathematics background to qualify for most majors. This denied women access to undergraduate majors in the sciences and therefore to related career opportunities. However, among entering freshmen at the University of Michigan in 1989, 76% of females and 90% of males had taken four years of math in high school (Frazier-Kouassi, et al., 1992).

Gender parity is being reached at the undergraduate level. In 1980, women earned 41% of bachelor's degrees in mathematics (U. S. Department of Education, 1998). By 1997, 46% were conferred on women (U. S. Department of Education, 2000). There is a greater disparity at the graduate level, though there has been some improvement. In 1980, women earned 33% and 14% of the master's and doctor's degrees, respectively, in mathematics (U. S. Department of Education, 1998). By 1997, females received 41% and 24% of the master's and doctor's degrees, respectively (U. S. Department of Education, 2000).

Though women are now entering occupations that were once male-dominated at a greater rate, women with high ability levels are not entering math-related occupations at the same rate as men with comparable abilities (Bureau of Education Statistics, 1988; Bureau of Labor Statistics, 1990, as cited in Bieschke & Lopez, 1991). Also, more women drop out of mathematics-related majors than men with the same grades (Boland, 1995). Since men and women are equal in math ability, then these differences must be caused by external reasons. Researchers have postulated that gender stereotypes are responsible. "The gender stereotypes which depict mathematics and science as male endeavors continue to affect women's choices of majors and careers" (Frazier-Kouassi, et al., 1992, p. 14). Discrimination certainly played a role in the under-representation of women in some fields in the past. Claudia Zaslavsky (1994), the author of *Fear of Math*, received her degree in actuarial science before World War II and found the field completely closed to women. Also, a friend's mother, who received her master's degree in chemistry in the mid-1960s, had to begin work as a part-time secretary before being able to use her skills in the company's lab. She later became the head chemist in that laboratory. "The barriers of social prejudice, custom, and societal mythologies about sex-based characteristics of girls and women continue to impede progress for women in science" (Vetter, p. 24 - 25).

Until relatively recently only an elite class made up mainly by white males of good economic status required more than a minimal math background for their careers (Zaslavsky, 1994). This has changed as the proportion of women and people of diverse racial and ethnic background joining the work force increased due to changing demographics in the U. S. In the late 1970s, half of mothers with children under eighteen were working (Zaslavsky). By 1997, 74% were employed full-time (Jacobs, 1998). Similarly, the number of working married women has climbed: 40% in 1970 (Zaslavsky), 50% in 1980, 58% in 1990, and 62% in 1997 (Jacobs).

In 1981, women earned about sixty cents to a man's dollar (Zaslavsky, 1994). Women's earnings climbed to seventy-five cents to a man's dollar by 1997 (Jacobs, 1998). Since traditionally women's jobs and low wages have gone together, Zaslavsky recommends that women go into other nontraditional fields that often require greater knowledge of mathematics and computers. Despite improved education and employment opportunities, women are under-represented in math-related careers. In 1980, women made up 71% of teachers and 99% of secretaries but only 4% of engineers (Skolnick et al., 1982). By 1998, women made up 75% of teachers and 79% of administrative support personnel but still just 11% of engineers (Bureau of Labor Statistics, as cited in The World Almanac, 1999). However, there have been improvements in some fields requiring a good math background. In 1979, 33% of accountants were women (Zaslavsky). That number had climbed to 46% by 1987 (Taeuber, 1996). Also, while 28% of computer programmers were women in 1979, the figure had risen to 40% in 1986 (Zaslavsky).

It is certain that stereotypes concerning gender and mathematics have resulted in harm in the past. Zaslavsky (1994) examined over 500 math autobiographies of students. Among her findings were that far fewer men were willing to examine and write down their negative experiences concerning mathematics. "Math anxiety" came to the forefront as a feminist issue in the mid-1970s (Zaslavsky). However, those who fear, and therefore avoid, mathematics are male as well as female (Zaslavsky). Many of the respondents indicated their fear began as far back as elementary school. In addition to remedial and developmental courses, Zaslavsky recommends universities help students who are returning to school, after perhaps years of avoiding mathematics, overcome their fears. Several autobiographies studied by Zaslavsky indicated that students realized they could succeed in mathematics despite initial setbacks such as low grades or poor instructors. This emphasizes the great responsibilities and opportunities instructors have to guide students' learning.

Despite fewer men reporting negative experiences (Zaslavsky, 1994), women often do better than men in the classroom. When gender differences in mathematics achievement are measured using grades in the classroom, results are the opposite of those found using the SAT. When differences are found, they almost always favor females, and these differences are consistent from junior high to university mathematics courses (Kimball, 1989). Also, as already noted in the meta-analysis of 100 studies (some of which involved other measuring devices besides the SAT) by Hyde et al. (1990), females outperform males by a slight amount when the sample is drawn from the general population. Findings such as these should help end gender-related mathematics stereotypes. In fact, if stereotypes were based upon scientific studies rather than myths, then one would state, there is an innate *female* mathematical superiority.

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Perimeter of Rectangles: Student Activity from TEXTEAMS Algebra I: 2000 and Beyond Institute

Overview: Students investigate linear relationships using concrete models, tables, diagrams, written descriptions, and algebraic forms.

Objective: **Algebra I TEKS**
(b.1) The student understands that a function represents a dependence of one quantity on another and can be described a variety of ways.
(b.3) The student understands algebra as the mathematics of generalization and recognizes the power of symbols to represent situations.

Terms: function, independent variable, dependent variable, pattern

Materials: color tiles, graphing calculator

Procedures: Students should be seated in groups of 3 – 4.

Activity: Perimeter of Rectangles
Do the activity together as a whole group, bringing out the following points and asking the indicated questions.

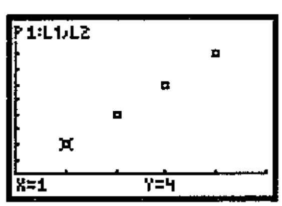
1. Encourage students to write how they found the number of perimeter in the process column. This can often be done in several ways, which will lead to different, yet equivalent algebraic expressions. This is a desired outcome. Possible equivalent expression include:

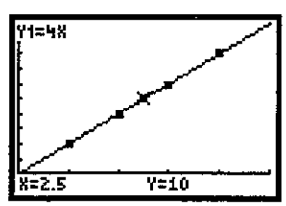
Sample Process
$1+1+1+1$
$2+2+2+2$
$3+3+3+3$
$n+n+n+n$

Sample Process
$4(1)$
$4(2)$
$4(3)$
$4n$

Sample Process

2. Justify: The variable x stands for the figure number and $x$min=0 to $x$max=5 shows the figures 1 – 4 nicely. The variable y stands for the perimeter and $y$min= -2 to $y$max=20 shows the perimeters of 4 to 18 nicely.





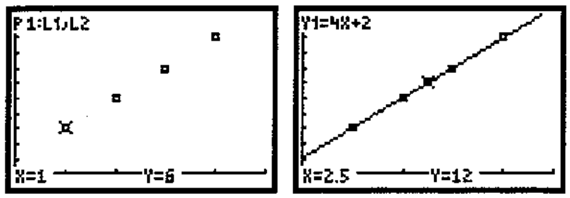
3. The perimeter of figure 11 is 44. $4(11)=44$
4. Figure 12 has a perimeter of 48. $4n=48$

Ask students to use the tiles to physically demonstrate the algebraic rules they found in the table. In this example, they will mainly be pointing to sides on the tiles and relating them to the numbers in the process column.

5.

Sample Process	*Sample Process*	*Sample Process*
$2+1+2+1$	$2(2)+2(1)$	$4(1)+2$
$3+2+3+2$	$2(3)+2(2)$	$4(2)+2$
$4+3+4+3$	$2(4)+2(3)$	$4(3)+2$
$(n+1)+n+(n+1)+n$	$2(n+1)+2(n)$	$4(n)+2$

6.



7. Figure 11 has a perimeter of 46. $4(11)+2=46$.
8. Figure 13 has a perimeter of 54. $4n+2=54$.

Ask students to use the tiles to physically demonstrate the algebraic rules they found in the table. For example, the rule in the first column above is simply adding each side in order. The rule in the second column above is noting that there are two sides of length $n+1$ and two sides of length n. The rule in the third column above is based on the idea of adding two additional sides to a square of side n.

Ask students to compare the rules, $P=4n$ and $P=4n+2$, and their respective graphs. Note that the lines have the same slope but that the line $P=4n+2$ is the line $P=4n$ shifted up two. The perimeters grow by the same amount each time you change figure numbers by one, but $P=4n+2$ starts 2 higher than $P=4n$.

Summary

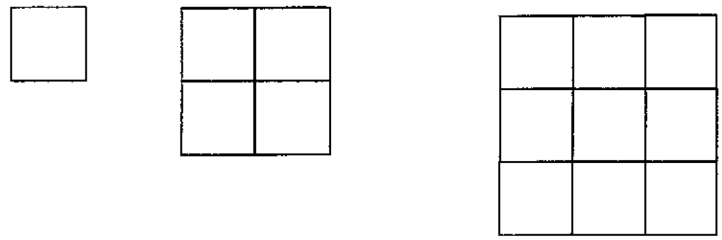
Using multiple representations, students gain added understanding for the linear relationship of a rectangle's perimeter and the length of a side.

Student Activity: Perimeter of Rectangles

Build these squares and the next three squares in the sequence, using color tiles.

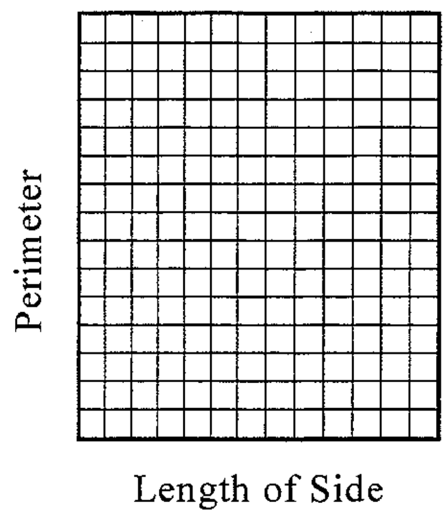
Figure number **1,** **2,** **3**

Figure



1. Complete the table, using the process column to write a function for figure *n*, and graph the relation.

Figure Number (length of side)	Process	Perimeter
1		
2		
3		
4		
5		
n		



2. On your graphing calculator, make a scatter plot. Graph the function over the scatter plot to confirm. Justify your window choice.

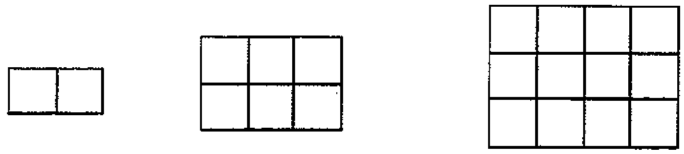
Answer the questions and write the equation that represents the question:

3. What is the perimeter of figure number 11?
4. What figure number has a perimeter of 48?

Build these rectangles and the next three rectangles in the sequence, using color tiles.

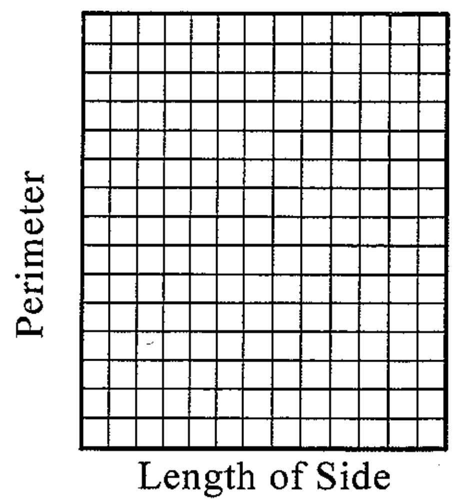
Figure number **1,** **2,** **3**

Figure



5. Complete the table, using the process column to write a function for perimeter of the *n*th figure, and graph the relation.

Figure Number (length of side)	Process	Perimeter
1		
2		
3		
4		
5		
n		



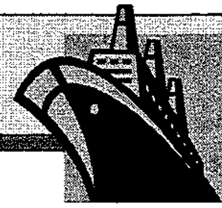
6. On your graphing calculator, make a scatter plot. Graph the function over the scatter plot to confirm. Justify your window choice:

Answer the questions and write the equation that represents the question:

7. What is the perimeter of figure number 11?

8. What figure number has a perimeter of 54?

LORAN: Student Activity from TEXTEAMS Conics Module



Two one day modules have been developed that complement the Algebra II/Precalculus TEXTEAMS institute. The first module focuses on Conics, and the second focuses on Parametric Equations. These two modules will be presented as part of the CAMT preconference on July 17 and 18. The following activity is a part of the Conics module.

Overview: The students use properties of conics and graphing to solve a navigation problem using a system of hyperbola equations.

TEKS: **Algebra II**

(b.3) The student formulates systems of equations and inequalities from problem situations, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation.

(c.2) The student knows the relationship between the geometric and algebraic descriptions of conic sections. In order to sketch graphs of conic sections, the student relates simple parameter changes in the equation to corresponding changes in the graph.

Precalculus

(c.5) The student will use conic sections, their properties, and parametric representations to model physical situations. The student is expected to use properties of conic sections to describe physical phenomenon the reflective properties of light and sound.

Terms: Hyperbola, foci

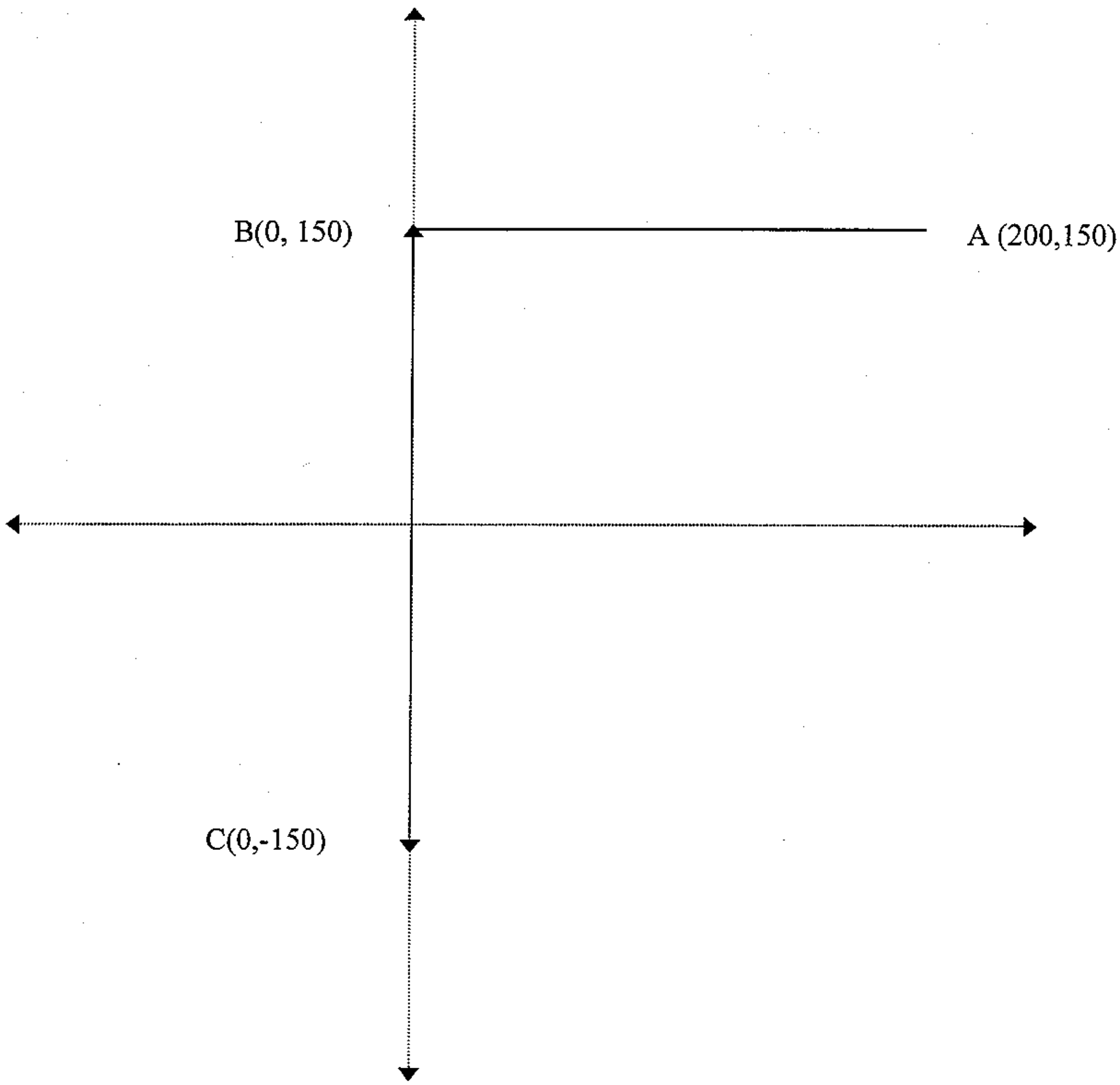
Materials: Graphing calculator

Procedure: Present the problem to the group and allow them time to solve in pairs.

As the students begin to work, circulate and ask questions to inspire their solutions.

- Where might you position the origin? *It may be positioned anywhere. Choices might be at B, A, C, or midpoints of the segments AB or AC.*
- How many functions must be graphed to determine the location? *An hyperbola equation implies two functions. Thus, for two hyperbolas four functions must be graphed to determine the location.*

The coordinate axes may be placed anywhere. A possible location is to place the origin at the center of the hyperbola with foci B and C using the transverse and conjugate axes of the hyperbola. The coordinates of point A are (200, 150). The center of the hyperbola determined by A and B is (100, 150).



Consider the hyperbola with foci B and C.

c is half the difference in the distance between the foci or 150. The difference in the distances is 2a.

$$2a = 569.6 - 369.6 = 200$$
$$a = 100$$
$$b^2 = c^2 - a^2 = 150^2 - 100^2$$
$$b = 111.8 \text{ miles}$$

The equation of the hyperbola is $\frac{y^2}{100^2} - \frac{x^2}{111.8^2} = 1$.

To graph on the calculator solve for y: $y = \pm 100\sqrt{1 + \frac{x^2}{111.8^2}}$

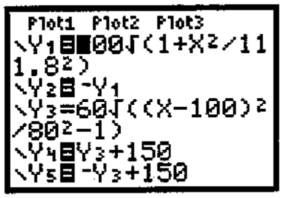
To determine the second hyperbola, use B and A as foci.

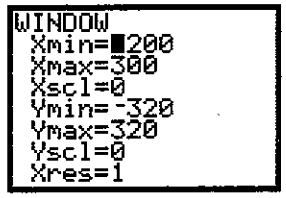
$$c = 100$$
$$2a = 369.6 - 209.6 = 160$$
$$a = 80$$
$$b^2 = 100^2 - 80^2$$
$$b = 60 \text{ miles}$$

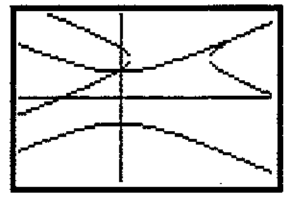
The center of the hyperbola is at (100,150). The equation of the hyperbola is

$$\frac{(x-100)^2}{80^2}-\frac{(y-150)^2}{60^2}=1.$$

To graph on the calculator solve for y: $y=\pm 60\sqrt{\frac{(x-100)^2}{80^2}-1}+150.$







There are 3 intersections points. Use the calculator to determine the intersection points by tracing, or if the calculator has the capability to find the intersection of two curves, use that ability to find the points.

The intersection points may be found by tracing or using the capability of a calculator to find the intersections points.

(-4.08,100.1)   (331.66,313.06)   (247.18, 242. 66)

Encourage a discussion on how you can decide which one to use. The ship must have been the specified distances from A, B, and C. You may use the distance formula to determine which point satisfies the given distances. A program may be written to perform the computations.

Label the points: M(-4.08,100.6), N(331.66,313.06), and P(247.18, 242. 66).
Use the distance formula to find the distances to A(200,150), B(0,150), and C(0,-150).

MA= 210.01
MC = 250.09
M is not the point because the distance to C should be about 569.6 miles.

NA = 209.54
NB = 369.57
NC = 569.58
N is the required distance from each point.

PA = 103.98
P is not the point because the distance to A should be about 209.6 miles.

The point to use is the point (331.66, 313.06).

- Is this the answer to the question? *Note that this point only has meaning in the selected coordinate system. A description can be given in terms of B. This point is 331.66 miles east and 163.06 miles north of B.*

Student Activity: LORAN

LORAN (Long Range Navigation) system is used to help navigators locate ships or planes. The Long Range Navigational system uses three broadcasting stations to determine the location of ships at sea. The stations send out a pulse. The navigator of the ship receives the pulses and determines the times taken to receive the signal. The distances from the two stations to the ship can be determined.

Three broadcasting stations are located at the points A, B, and C. A is located 200 miles east of B. C is located 300 miles south of B. The navigator sends a pulse and finds the following distances:

Point	A	B	C
Distance from Ship	209.6 miles	369.6 miles	569.6 miles

The stations are taken in pairs to serve as the foci of a hyperbola. The differences in the distances locate the ship on a hyperbola. The same calculations are taken using a different pair of stations. The second hyperbola is determined. The location of the ship is the intersection of the two hyperbolas. Use A and B as the foci of the hyperbola and then use B and C as the foci of a second hyperbola. Use a graphing calculator to determine the location of the ship.

Lone Star News

CAMT 2001
A Math Odyssey
The Journey Continues . . .
July 19-21
Henry B. Gonzalez Convention Center
San Antonio, Texas

If you went to CAMT, share your experience with others. What was the best part of CAMT? What difference has it made in your classroom this year? How has it impacted your teaching? Why are you glad you went? Send a short e-mail response to mmorvant@personalcomputer.net. Your response could appear in the fall journal.

Sponsors

Texas Council of Teachers of Mathematics
Texas Association of Supervisors of Mathematics
Texas Education Agency
Texas Section of the Mathematical Association of America

Make plans now to be at CAMT next summer. If you have not been to CAMT before and have taught five or less years, fill out the CAMTership application on p. 24. You could be chosen to receive $100 toward your CAMT expenses.

Future CAMT Dates

2002	July 8-10	Dallas, Adam's Mark Hotel
2003	July 30-Aug 1	Houston, George R. Brown Convention Center
2004	July 15-17	San Antonio, Henry B. Gonzalez Convention Center
2005	July 11-13	Dallas, Adam's Mark Hotel

Affiliated Group News

- **Austin Area CTM:** AACTM hold regular meetings. Contact Mary Alice Hatchett for information. Mary_Hatchett@RoundRockISD.org

- **Alamo District CTM:** For information on ADCTM contact: Synthia Silva-Avila at (210) 659-9633 or ssilva@judson.k12.tx.us.

- **Fort Bend CTM** will be having its Spring Banquet on May 3, 2001 at 6:30 in the evening at the Riverbend Country Club on Dulles Avenue. The guest speaker will be Dr. Anne Papakonstantinou of Rice University. For more information, contact Susan Cinque at 105004.72@compuserve.com.

- **Rio Grande Valley CTM:** RGVCTM typically meets on the last Thursday of every month with additional days scheduled prior to the conference. For more information, contact Sharon Walsh-Cavazos at cavalsh@aol.com.

CAMT FOCUS ON TEXTEAMS ACTIVITIES

Come and see the ways in which TEXTEAMS mathematics institutes may be used to enhance instruction. Three rooms have been set aside at CAMT in San Antonio, July 19, 20, and 21 for previewing the instututites. TEXTEAMS leaders will present one to two hour sessions on activities from these institutes:

- Rethinking Middle School Mathematics: Algebraic Reasoning
- Rethinking Middle School Mathematics: Numerical Reasoning
- Rethinking Secondary Mathematics: Algebraic and Geometric Models
- (formerly called Mathematical Modeling Institute)
- Algebra I 2000 and Beyond
- Algebra II / Precalculus

Look in the CAMT program for room locations. Also, there will be a poster at the Dana Center booth in the Exhibit Hall with a schedule of activities.

TCTM Breakfast and Business Meeting

Come join us for the annual TCTM breakfast and business meeting. This is your opportunity to meet your board members and be apart of TCTM decisions. Plus, there will be **great door prizes** from the vendors you will see at CAMT. Some of the prizes last year included books, manipulatives, games, and **calculators**. Don't miss out!

Saturday, July 21, 2001
7:00 – 8:30 a. m.
Conference Rooms 17-18, Marriot Rivercenter

__________ Enclosed find my $10.00 check for the TCTM breakfast and business meeting reservation.

NOTE: Breakfast tickets must be reserved. There will not be tickets available at the conference.

Member Information

Name ____

Home Address ______________________________ ESC region ______

City, Zip ______________________________ Phone ______________

E-mail Address ______________________________________

School, District, or Professional Affiliation ______________________

Send this form **no later than June 1, 2001** to:
Kathy Mittag
4627 Pinecomb Woods
San Antonio, TX 78249

Tickets to the breakfast will be mailed to your home about July 15.

TCTM MEMBER PARTICIPATION FORM FOR CAMT

All members of TCTM should take an active role to help make CAMT successful. Please examine the times and volunteer to serve. Circle the time slot(s) you can help. If you cannot help for the whole time period, please indicate when you can work in the margin.

CAMT REGISTRATION DESK

Henry B Gonzalez Convention Center, Exhibit Hall C Foyer
San Antonio, Texas

Wednesday, July 18	1:30-3:30 p.m.	3:30-5:00 p.m.		
Thursday, July 19	6:45-9:00 am	9:00-11:00 am	11:00 am-1:00 p.m.	1:00-3:00 p.m.
Friday, July 20	7:15-9:00 am	9:00-11:00 am	11:00 am-1:00 p.m.	1:00-3:00 p.m.
Saturday, July 21	7:15-9:30 am			

NCTM Materials Sales and TCTM Booth

Henry B Gonzalez Convention Center, Exhibit Hall C

Thursday, July 19	8:30-10:30 am	10:30 am–12:30 p.m.	12:30-2:30 p.m.	2:30-4:30 p.m.
Friday, July 20	8:30-10:30 am	10:30 am–12:30 p.m.	12:30-2:30 p.m.	2:30-4:30 p.m.
Saturday, July 21	8:30-10:30 am	10:30 am-12:30 p.m.		

Member Information

Name ______________________________

Home Address ______________________________ ESC region _____

City, Zip ______________________________ Phone ______________

E-mail Address ______________________________

School, District, or Professional Affiliation ______________________________

Fold this form in three, staple, and **send no later than June 1, 2001** or **email** the information to Kathy Mittag at kmittag@utsa.edu.

Confirmation of your registration or NCTM materials booth assignment will be mailed to your home about July 15.

Place
stamp
here.

Kathy Mittag
4627 Pinecomb Woods
San Antonio, TX 78249

Algebra Assessment Project

The Algebra Assessment Project of the Charles A. Dana Center began in the fall, 2000, with the convening of an advisory team of administrators, teachers, mathematics supervisors, representatives from TEA, and national testing experts. This team decided on the guidelines for the creation of defining problems for Algebra I. A team of writers has created eleven sets of problems aligned to the TEKS. A set of supplemental resources including additional smaller problems, student work, and analysis has been included with each set of problems.

The set of assessments will be available on the Mathematics Toolkit website in fall of 2001. Staff development will also be created to help with the implementation of these assessments.

The assessments may be previewed at CAMT. Two hours sessions will be repeated each morning. This two-hour session will describe some of the problems and consider ways in which the problems may be used for assessment and instruction. See the CAMT program for location and times.

CAMTERSHIP APPLICATION

Six $200 CAMTerships will be awarded to those teaching five or fewer years who are members of TCTM and have not attended CAMT before. The money is intended to help cover expenses associated with attending CAMT and to encourage new teachers to attend CAMT. Two CAMTerships will be awarded to teachers in each of the following grade levels: K - 4, 5 - 8, and 9 - 12. Winners will be determined by random drawing of names and will be notified by March 1, 2001. Winners will be asked to work for two hours at registration or NCTM material sales and will be TCTM's guest at our breakfast, where the checks will be presented. Good luck!

Deadline: May 15, 2001

Name: ______________________________

Phone number: ______________________

Home address: _________________________

City, zip: ____________________

School: ______________________________

Grade(s) taught: ________________

School address: ______________________________

School phone: ___________

Principal's name: ______________________

Are you a member of TCTM? ________

Note: If you are not a member of TCTM, you must enclose $13 with this application to apply for membership.

Have you attended CAMT before? _________

How long have you been teaching? _________

Describe your primary teaching responsibilities:

Send your completed application to: Kathy Mittag
4627 Pinecomb Woods
San Antonio, TX 78249

TCTM Leadership Award Application

The TCTM Leadership Award is presented to a TCTM member who is nominated by a TCTM Affiliated Group. This person is to be honored for his/her contributions to the improvement of mathematics education at the local and state level. He/she has designed innovative staff development and has promoted the local TCTM Affiliated mathematics council. **Deadline: June 1, 2001**

Information about the of Affiliated group nominating a candidate:

Name of Affiliated Group: ______________________________

President of the Affiliated Group: ______________________________

Home address: ______________________________

Home phone: ______________ Business phone: ______________ E-mail: ______________

Are you a member of TCTM? _________ NCTM? ___________

Information about the person being nominated:

Name: ______________________________

Home address: ______________________________

Home phone: ______________ Business phone: ______________ E-mail: ______________

Is the nominee a member of TCTM? _________ NCTM __________ Retired ________

Applications should include 3 pages:

- Completed application form
- One-page, one-sided, typed biographical sheet including:
  - Name of nominee
  - Professional activities
  - State/local offices or committees
  - Activities encouraging involvement/improvement of math education
  - Staff Development
  - Honors/awards
- One-page, one-sided essay indicating why the nominee should be honored for his/her contribution to the improvement of mathematics education at the state/national level.

Send the completed application, biographical sketch, and essay to

Kathy Mittag
4627 Pinecomb Woods
San Antonio, TX 78249

E. Glenadine Gibb Achievement Award Application

The E. Glenadine Gibb Achievement Award is presented to someone nominated by a TCTM member to be honored for his/her contribution to the improvement of mathematics education at the state and/or national level. **Deadline: June 1, 2001**

Information about the TCTM member nominating a candidate:

Name: ____

Home address: ____

Home phone: ______________ Business phone: ______________ E-mail: ______________

Are you a member of TCTM? ____________ NCTM? ____________

Information about the nominee:

Name: ____

Home address: ____

Home phone: ______________ Business phone: ______________ E-mail: ______________

Is the nominee a member of TCTM? _________ NCTM? _________ Retired _________

Applications should include 3 pages:

- Completed application form
- One-page, one-sided, typed biographical sheet including:
  - Name of nominee
  - Professional activities
  - National offices or committees
  - State TCTM offices held
  - Local TCTM-Affiliated Group offices held
  - Staff Development
  - Honors/awards
- One-page, one-sided essay indicating why the nominee should be honored for his/her contribution to the improvement of mathematics education at the state/national level

Send the completed application, biographical sketch, and essay to:

Kathy Mittag
4627 Pinecomb Woods
San Antonio, TX 78249

TEXAS COUNCIL OF TEACHERS OF MATHEMATICS
MATHEMATICS SPECIALIST SCHOLARSHIP

Amount: $500-1000

Application Deadline: June 1, 2001

Eligibility: Any student who will graduate in 2001 from a Texas high school - public or private - and who plans to enroll in college in the fall of 2001 to pursue a career in mathematics teaching either as a mathematics specialist in elementary school or as a secondary school teacher with certification in mathematics.

Name: ____
Last First Middle

Address: ____
Number and street Apt. number

____
City Zip code

Phone number: (   )________________ Birth date: ________________

Social security number: ________________________

High school(s) attended: ________________________

What college or university do you plan to attend? If you are awarded this scholarship, TCTM's treasurer will send a check directly to the business office of the college. We need the college's complete address.

Enclose the completed application with each of the following in the same envelope and mail to Pam Alexander at the address listed below. **<u>YOU MUST INCLUDE 3 COPIES OF ALL REQUIRED MATERIALS</u>.**

1. On a separate sheet, list high school activities including any leadership positions.
2. Official high school transcript
3. Letter of recommendation from a TCTM member
4. An essay describing your early experiences learning mathematics and any experiences explaining mathematics to your classmates or friends. This essay must be no more than two pages, double-spaced.
5. An essay telling why you want to be a mathematics specialist in elementary school or a mathematics teacher in middle or high school. This essay must be no more than one page, double-spaced.

Return all materials in one envelope to:

Kathy Mittag
4627 Pinecomb Woods
San Antonio, TX 78249

Southwest Texas State University (SWT) Middle School Math Certification Initiative

The SWT Middle School Math Certification Initiative is funded by the National Science Foundation's Collaboratives for Excellence in Teacher Preparation Program. The goal of the project is to significantly increase the numbers of qualified middle school mathematics teachers, trained in appropriate student-centered content and pedagogy who are enthused about teaching and remain in the profession. We will create and sustain this new middle school mathematics certification program through a collaborative process involving recruitment, mentoring, curriculum improvement and implementation, certification, and induction. Collaborative partners include Southwest Texas State University, Austin Community College, and San Antonio College. For more information, please contact Paul Kennedy (pkennedy@swt.edu) or visit our website at http://www.math.swt.edu/~cetp/.

Texas Rural Systemic Initiative (TRSI)

The Texas Rural Systemic Initiative (TRSI) is a partnership built upon the infrastructure of the Texas A&M University System and involves universities, K-12 schools, regional education service centers, Texas Education Agency, Texas Statewide Systemic Initiative, and other partners such as Southwest Educational Development Laboratory, Texas Association of Community Schools, Fort Worth Museum of Science and History and the Exploratorium in a collaborative effort to provide high quality mathematics and science education for students in rural Texas. The project is housed at West Texas A&M and is directed by Mrs. Judy Kelley. For more information, call 806-651-2271, email jkelley@mail.wtamu.edu, or go to the web site http://www.texasrsi.org/.

Texas Collaborative for Excellence in Teacher Preparation

The Texas Collaborative for Excellence in Teacher Preparation (TxCETP) is an NSF-funded initiative designed to promote reform in the teaching and learning of mathematics and the sciences at the university level in order to better prepare K-12 science and mathematics educators. TxCETP partners include university faculty members and administrators in Education, Sciences and Mathematics from ten Texas campuses, along with faculty members and administrators from associated community colleges and K-12 partner schools. The project has three deliverables:

1) Certification of more and better prepared K-12 science and mathematics teachers;
2) Reformed undergraduate courses that model inquiry-based teaching and learning, and for which materials are available on the web;
3) Inquiry Road Show – an introduction to inquiry. A half- to full-day experience for university professors, which can be appropriately modified for presentation to high school and middle school teachers.

For more information, contact Kit Price Blount, Texas A&M University – Corpus Christi, at kpblount@falcon.tamucc.edu.

University of Texas Secondary Pre-Service Program in Math and Science

For more information, contact Michael Marder at marder@chaos.ph.utexas.edu.

PROFILES OF OFFICER CANDIDATES

President-Elect

Cynthia Schnieder

Cynthia Schneider has served on the TCTM board for the last four years as the Central Regional Director. She has spoken on various topics at several regional affiliated group meetings such as the Austin Area Council of Teachers of Mathematics, the Panhandle Conference, and STEAM. Currently, she is an educational researcher at the University of Texas Charles A. Dana Center. She completed her Ph.D. in Mathematics Education from U.T. Austin in December 2000. She has also worked in a support capacity during the piloting of professional development for an NSF-funded NCTM Standards-based middle school curriculum. Before that she taught mathematics at Southwest Texas State University, Austin Community College, and Southwestern University. She is certified at the secondary level in both mathematics and history. Cynthia believes in supporting classroom teachers through her participation in professional organizations such as TCTM and other local affliated groups. She currently lives in New Braunfels, Texas

Carol Williams

Carol Williams completed her B. A. degree in mathematics education in 1969 at Lipscomb University in Nashville. She finished her doctorate in mathematics education at the University of California, Santa Barbara in 1994. Carol has 11 years of secondary teaching experience and is completing her 15th year in the college classroom. This is her sixth year at Abilene Christian University where she is a professor in the Department of Mathematics and Computer Science. Her responsibilities there include teaching courses for pre-service elementary and secondary teachers as well as serving as academic advisor for the mathematics education majors. Carol served as the secretary of TCTM from 1996 to 2000. A frequent presenter at CAMT and her local affiliate of NCTM, Carol enjoys the challenge of preparing the mathematics teachers of tomorrow as well as helping those already in the classroom become better teachers.

Vice President Elementary

Wilma Cook

Wilma Cook has been an elementary teacher in Fort Worth from 1983 – 1994, teaching inner city children in grades 3, 4, and 5. In 1995, she became an elementary mathematics specialist teaching only mathematics to the 5th grade students at her school. For the past three years, she has served as a member of Fort Worth's Instructional Support Team. In this role, she provides support to elementary classroom teachers by providing inservice, demonstrating lessons, developing curriculum, tutoring students, providing parent programs, and assisting teachers as they work to improve student achievement. In addition, she serves as a technology specialist for the school district.

Wilma's priority is to enable students to become proficient problem solvers. As a result, she offers training, demonstrating the process of problem solving. Her view: Problem solving is a skill that must be taught. In order for students to become successful, teachers must train them to proceed through a systematic series of steps toward the solution. Ms. Cook believes educators must provide students with opportunities to learn cooperatively, the challenge to think logically, and the setting in which they can talk about mathematics.

Treasurer

James Telese

James Telese is an Associate Professor of Secondary Education and Mathematics Education at the University of Texas, Brownsville. He is a former middle and high school mathematics and Earth science teacher. He taught in Corpus Christi and College Station public schools. He earned a Ph. D. in mathematics education from Texas A & M University, where he worked closely with elementary and middle school mathematics teachers in the development of performance assessments. He has published in the area of assessment and equity. He maintains strong ties with public school mathematics teachers in the Brownsville area and has conducted research on algebra teaching. Dr. Telese has directed Eisenhower professional development projects and is a team member of an Urban Systemic Initiative. Dr. Telese is dedicated to improving the mathematics teaching in the Lower Rio Grande Valley.

Southwest Regional Director

Ullrich Reichenbach

Ulli Reichenbach is in her 29th year of teaching high school math, currently at Montwood High School in Socorro ISD. She also has three years experience teaching 7th and 8th grade math. For the last 13 years, she has taught part-time at El Paso Community College. Before coming to El Paso, I was very active in the North Dakota Council of Teachers of Mathematics. I am a life-time member of NCTM and am currently the Past-President of the Greater El Paso Council of Teachers of Mathematics. Ms. Reichenbach holds a masters in mathematics from the University of North Dakota and continues to study mathematics.

Alicia Torres

Alicia Torres is currently the math facilitator for El Paso ISD for grades 6-12. Before that she served as an EPISD region math facilitator and team leader for grades PK-12 and taught high school mathematics for 18 years. Her other experiences include EPISD Staff Developer, program chair for NCTM Regional, and program committee NCTM 2001 Orlando and CAMT 2002 Dallas. In addition, she has been a member of GEPCTM for several years and most recently has been on their Planning/Advisory Committee.

The editoral committee would like to thank the following people for reviewing articles.

Pam Alexander	Judy Rice
Judy Bishop	Sheryl Roehl
Susan Cinque	Janie Schielack
Paula Gustafson	Cynthia Schneider
Bill Jasper	Pam Summers
Beth Komorowski	Sharon Taylor
Dr. Charles Lamb	Susan Thomas
Susan Larson	Joan Whitworth

If you are interested in reviewing articles for the *Texas Mathematics Teacher*, please contact Michelle Morvant at mmorvant@personalcomputer.net.

Teacher's Place

TCTM is dedicated to helping mathematics teachers become more effective educators. One way we do this is through the *Texas Mathematics Teacher*. Teacher's Place is where you can share with other teachers. Have you seen a useful web site, used a quality book in class, or developed a lesson students enjoyed? What do you know that might help someone else be a little more effective?

Please send any ideas to me at mmorvant@personalcomputer.net. If choosen, your information will appear with credit to you, and you will receive an extra journal. As you reflect on the past school year, please take a few minutes to let me know what was successful for you this year.

Sincerely,

Michelle

Michelle Morvant
Assistant Editor, *TMT*
Mathematics Teacher, Ingram Tom Moore HS

Websites

Figure This
www.figurethis.org

Figure This is a colorful, fun site filled with interesting math activities and challenges for families. Lots of the challenges could be used in your classroom.

Fun Mathematics Lessons
math.rice.edu/~lanius/Lessons

This site has several good lessons on several topics such as fractals, ratios, fractions, and slope. Lessons are written by Cynthia Lanius, and the site is hosted by Rice University.

Books

Just For the Fun of It! by AIMS is filled with challenging, interesting problems that reinforce and use problem solving skills. I used it in a remedial class for ninth graders, doing one activity every two weeks or so. My students really enjoyed it. Often the student that did not usually preform well would come up with the best or most creative solutions. I was excited to see my students using problem solving skills and working together. This book is high quality and easy to use. Order online at www.aimsedu.org.

Southeast Regional Director

Charles Lamb

Dr. Charles Lamb is a professor of mathematics education at Texas A & M, where he has taught for the last seven years. Before that, he taught nineteen years at the University of Texas. Dr. Lamb received his Ed. D. from the University of Georgia in 1975. Since then, he has been very active in mathematics education. He is a long-time member of NCTM. He has many speaking engagements, including at NCTM conferences and CAMT, and numerous publications. In addition, he was the Texas UIL mathematics director for several years.

Jo Ann Wheeler

Jo Ann Wheeler is the Director of Mathematics/ Science/Social Studies Services for Region IV Education Service Center. For the past six years, Jo Ann has provided the leadership and direction for the mathematics program at Region IV ESC. Her aim while serving at Region IV ESC has been to provide resources and leadership necessary to foster a spirit of collegiality among public educators in her area.

Jo Ann has also worked with the Texas Statewide Systemic Initiative as an advisor for many statewide initiatives as well as the project director for two mathematics institutes. She is currently involved in the Conference for the Advancement of Mathematics Teaching as a member of the program committee and as co-chair of the exhibits committee. Prior to working at Region IV ESC, Jo Ann taught mathematics at Jersey Village High School in the Cypress-Fairbanks Independent School District.

Imagine yourself on the TCTM Board! Let your regional director know if you are interested in being a future candidate.

South Regional Director

Juan Gonzalez

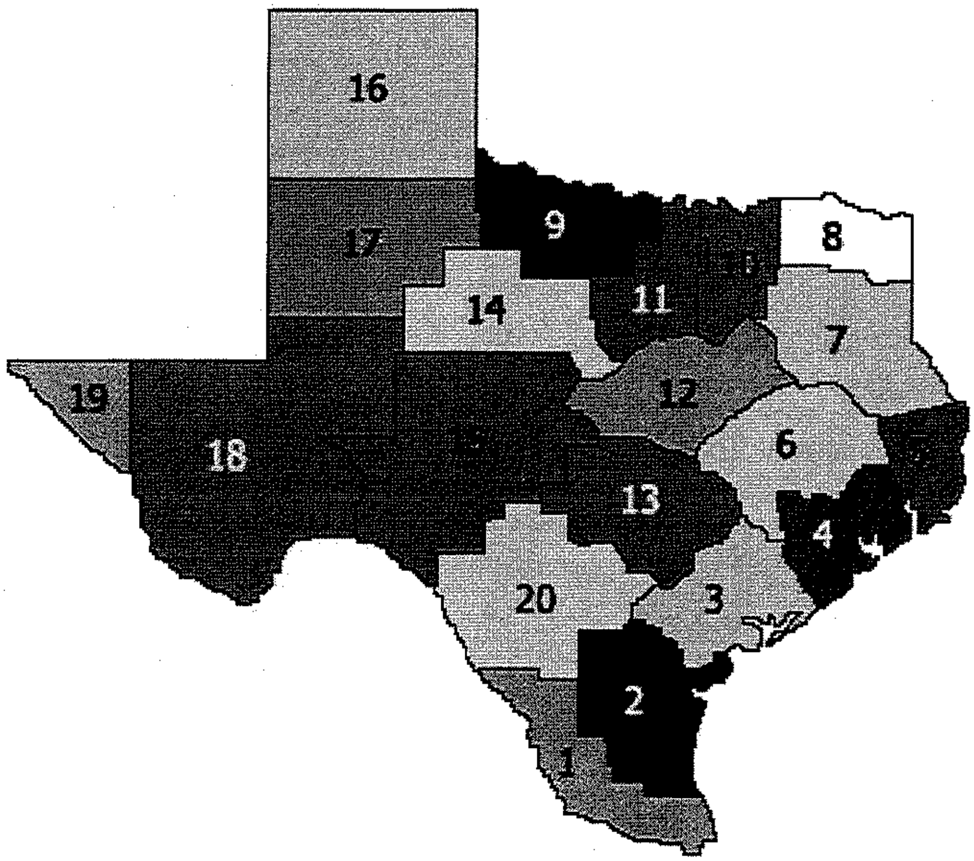
Juan Manuel González-Alfaro has been teaching 14 years. Currently, he teaches Algebra II and precalculus at the Vidal M. Treviño School of Communications and Fine Arts in Laredo, Texas. He also teaches part-time at the Laredo Community College. He is a consultant for Texas Instruments and, as a T^3 instructor, present algebra workshops and summer institutes to teachers across Texas. He is also a TEXTEAMS trainer in the areas of Algebra I, Alg.II/Precal, Geometry, and Mathematical Models. Mr. Gonzalez has served in various state committees, such as the Algebra Alternative Assessment committee, the Algebra I Institute Revision committee, and the Algebra II Textbook Selection committee. One of the highlights of his career as a teacher was presenting an algebra institute in Spanish to teachers at the Universidad de Puerto Rico in San Juan last summer. He has a M. S. in Secondary Education with a minor in mathematics. He and his wife, Graciela Gonzalez, have three children, Edgar Alejandro, Jassia Carolina, and Diana Celina. Juan served in the U.S. Navy for eight years and was honorably discharged in 1985. He is a second-degree Black Belt (I teach martial arts part-time to relieve stress) and a certified open water SCUBA diver.

Sheryl Roehl

Sheryl Roehl is currently serving her eighth year as the secondary Math/Science Specialist at Region III Education Service Center. She is also the Curriculum Specialist and TAAS Coordinator for Region III. She is in charge of the Eisenhower Math/Science Coop for 34 school districts. She has a B.S. in mathematics and a Master of Science degree. Mrs. Roehl has taught high school math, science, and computer programming for 12 years. She has also taught at the college level. She has made numerous presentations at CAMT and NCTM as well as CAST and NSTA and is currently serving as co-chair of the CAMT exhibits for the second year. She is working with 2 universities on six different Eisenhower Higher Education Grants. She also has received numerous grants and is currently a content specialist for a 2.5 million dollar TIE grant to address the needs of Algebra I. She is a member of NCTM, TCTM, TASM, and AMA and is serving as the Governance Contact for the Texas Associations of Math Supervisors. She is also a Danforth Fellow.

Texas Council of Teachers of Mathematics

Regions



TCTM Region	ESC Regions
Southwest	15, 18, 19
Southeast	4, 5, 6
Northwest	9, 14, 16, 17
Northeast	8, 7, 10, 11
South	1, 2, 3
Central	12, 13, 20

Vote

BALLOT

Circle your choices below. Write-in candidate names are acceptable. Then fold this ballot in three, tape, and mail. You may place it in an envelope and mail to the address on the next page if you prefer. **Please return by June 1, 2001.**

President-Elect

Cynthia Schnieder   Carol Williams

Vice-President Elementary

Wilma Cook

Treasurer

James Telese

Southwest Regional Director

Vote only if you live in one of these Service Center Regions:
15, 18, 19

Ullrich Reichenbach   Alicia Torres

Southeast Regional Director

Vote only if you live in one of these Service Center Regions:
4, 5, 6

Charles Lamb   Jo Ann Wheeler

South Regional Director

Vote only if you live in one of these Service Center Regions:
1, 2, 3

Juan Gonzalez   Sheryl Roehl

place
stamp
here