for one student may be easy for another. For individual work, cards can be handed to students so that each is working on a different problem. For many of the students, the problems can be handled very quickly, usually in three to five minutes.

Directions are given on the cards with permission granted to copy them on a copy machine. Field tests of the cards have shown that students find some cards easy and some frustrating. Teachers are advised to use strategy to ensure that students experience success. On occasion, students might work in pairs with two to six cards. They could work independently first and then compare answers.

Cards might be posted on the bulletin board in a section on visual thinking. They might be used for extra credit or free-time activities.

A sixteen-page paperback teacher's commentary discusses the role of visual thinking in society, discusses facets of three-dimensional drawings and of relationships (alike, different, similar, above, below, etc.), and gives suggestions for teaching. Major concepts are presented on the cards—sometimes only one, sometimes two or more. The booklet gives answers with drawings and diagrams in a figure-answer section. The secondary set uses more difficult applications, but both sets are appropriate for students at both elementary and secondary levels.

These boxed cards offer a neat, compact, easily accessible set of thinking problems in attractive, useful format.—*Margaret Holland.*

Wall Chart

A Piece of PI, Dale Seymour. 1983, $9.95. Dale Seymour Publications, P.O. Box 10885, Palo Alto, CA 94303-0879.

This is a really big *Piece of Pi!* Order yours and you will receive in a mailing tube five strips of heavy, slick white paper (10″ × 60″) with large green numerals that give the value of π accurate to more than seventy places. You can connect these five strips and wrap them around your classroom to give "visual force to the nonrepeating, never ending nature of π."

While you are using this visual aid (calculated by computer), you can tell your students (or let them look up) all about the early mathematicians who did the tedius computation of π long before this computer age. Ludolph Van Ceulen (1539–1610) found π to thirty-five decimal places by using polygons of 60×2^{33} sides. Thus π, in his honor, has been called "Ludolph's number," and his approximation, in compliance with his request, was carved on his tombstone in St. Peter's Churchyard at Leyden.

Or tell them about Francisca Vieta (1540–1603), who developed π to nine places as a convergent series. Or quote the value of π from the Bible and the Egyptians (I Kings 7:23 and II Chronicles 4:2).

For a last word, hearsay has it that an Indiana legislator introduced a bill making $\pi = 3$. At least, our politicians try to look our way sometimes.—*Margaret Holland.*

NEW PROJECTS

Seeking Youths Who Reason Extremely Well Mathematically

Since November of 1980 the Study of Mathematically Precocious Youth (SMPY) at Johns Hopkins University has been searching systematically for students born in 1968 or later who score at least 700 on the mathematical part of ths College Board's Scholastic Aptitude Test (SAT-M) before their thirteenth birthday, its "700–800M before Age 13" group. The average college-bound twelfth-grade male scores 493, and the average student entering Johns Hopkins had scored 671 as an eleventh or twelfth grader, so a score of 700 to 800 at age twelve or younger is truly remarkable; approximately 1 in 5000 boys and girls those ages does so well. Nevertheless, by April of 1983, SMPY had found 240 such scorers throughout the United States.

If examinees have already reached their thirteenth birthday at the time the SAT is taken, they can still qualify by earning an extra 10 points on SAT-M for each month or fraction of a month beyond age thirteen. For example, at age thirteen years and barely three months, a student must attain a score of 730 rather than 700.

If students aspire to join this group, they need to get, without cost, the application form for the SAT and a copy of the practice booklet entitled "Taking the SAT" from the nearest senior high school. By studying the booklet carefully and taking all the practice tests under timed conditions, the student can decide whether or not to take the SAT in a regular national administration. (Persons of any age may take the SAT, even though it is designed chiefly for eleventh and twelfth graders of above-average academic ability.) If a student takes the regular exam and attains the qualifying score, a copy of the score report should be sent immediately to Professor Julian C. Stanley, Director of SMPY, Psychology Department, Johns Hopkins University, Baltimore, MD 21218 (telephone 301/338-7087).

As a result of this recognition, new qualifiers can receive many benefits, including the following: (1) formal recognition at an awards ceremony; (2) rosters of the other members; (3) eligibility and scholarships for special, fast-paced, high-level, residential, three- or six-week summer courses in such subjects as precalculus and calculus mathematics, physics, chemistry, biology, computer science, writing, Latin, German, and quantitative (micro-)economics; (4) much information about how to devise more flexible educational programs; (5) eligibility for mentor-by-mail help in calculus and sciences; and (6) educational counseling.

The staff of SMPY urges teachers of mathematically brilliant youths of this age to alert such students to this opportunity for invaluable identification and supplemental education.

Johns Hopkins also searches continually across the nation for students who score at least 630 on the verbal part of SAT before age thirteen—the "630-800V before Age 13" group. The rules are the same as for SAT-M, except that a copy of the SAT score report should be sent to Dr. William G. Durden, Director, Center for the Advancement of Academically Talented Youth (CTY), 305 Latrobe Hall, Johns Hopkins University,

Baltimore, MD 21218 (telephone 301/338-8427).

Persons taking the SAT to qualify for the 700–800M group should make every effort to do well on SAT-V and SAT's Test of Standard Written English (TSWE), both to strive for the 630–800V group and also to qualify for taking verbal courses in CTY's residential summer programs.

The truly top group consists of those few students (only thirty-one thus far) who, before age thirteen, score at least 700M *and* 630V. They are eligible for substantial scholarships.—*Julian C. Stanley, Johns Hopkins University, Baltimore, MD 21218,* and *Nancy Whitman, University of Hawaii at Manoa, 1776 University Avenue, Honolulu, HI 96822.*

The Challenge of Mathematics

A group of mathematics teachers in northeast Mississippi have found a way for students who excel in mathematics to illustrate their expertise by participating in an annual mathematics contest sponsored by this group of teachers. Both junior and senior high school students have a contest each spring to identify the best mathematics students in various areas of mathematics.

This idea originated a few years ago when a small group of teachers organized the Northeast Mississippi Council of Teachers of Mathematics, one of whose purposes is to promote academic excellence.

A committee was formed to organize the contest. The first junior high school mathematics contest was held at Itawamba Junior College the following spring. Individual written tests were given in the following three categories: seventh grade, eighth grade, and first-year algebra. Awards were given in each category. The climaxing event was the team competition, where each team, composed of four members, had at least one seventh-grade and one eighth-grade student participating.

The contest was a great success. Since the teachers and students reacted with such enthusiasm, a contest was organized for senior high school students. Written tests were given in geometry, second-year algebra, and advanced mathematics, with each student entering only one category. Four participants in the written tests composed a team to compete in the team event. The four team members included at least one student from geometry and one from second-year algebra.

Each of the tests for the individual competition was composed of multiple-choice questions. These questions were selected by a committee from a list of questions submitted by interested mathematics teachers. The question-selection committee for a given area of mathematics was comprised of teachers of subjects outside that area. The teachers administered and proctored the one-and-one-half-hour tests. This procedure enabled many teachers to be actively involved.

The team competition was organized in two sessions with one-half of the teams competing in each session. Three teams were selected as finalists from each session. These six teams then competed for first, second, and third place. Questions for the team competition were submitted by mathematics teachers, and a committee composed of teachers not directly involved in the teaching of team members selected the questions to be used in the competition. These questions were computational in nature and presented to the teams simultaneously through the use of an overhead projector. The first, second, and third teams to report correct answers within a designated time frame were awarded points according to the order in which they reported correct scores. Again, many teachers were involved as judges and spotters. While the teachers determined the results, the students were entertained by a collegiate talent group. Certificates were given to every participant; ribbons, cash awards, trophies, and certificates of honorable mention were awarded to winners.

The contests are now in their fifth year, and the number of participating schools has increased every year. The excitement over academics and competition has been exuberating. The mathematics teachers of northeast Mississippi have found that many students indeed have a zeal and talent for mathematics.

For detailed information on the operation of this contest write to Dr. Nellie M. Tindoll, Department of Mathematics, University of Mississippi, University, MS 38677.—*Nellie M. Tindoll.*

NEW PUBLICATIONS

Code: Tj = Textbook, junior high
Ts = Textbook, senior high
Tt = Textbook, two-year college
L = Library
P = Professional
S = Supplementary student reading

Algebra, an Introductory Course (Ts, Tt), Mervin L. Keedy and Marvin L. Bittinger. 1983, xvi + 404 pp. $22.95 cloth. ISBN 0-201-14798-X. Addison-Wesley Publishing Co., Reading, MA 01867.

This book is an excellent introduction to algebra. The presentation and development of the usual topics through qradratic equations, including a chapter on inequalities and sets, is exceptionally well done. Care is taken to introduce each topic in a clear, logical fashion. For example, the principle for multiplying negative numbers is stated after a pattern is displayed by multiplying successive whole numbers from 4 to −3 by −5. A strong emphasis is also shared on developing algebraic skills, with each skill illustrated by carefully chosen examples. The text is written in a clear, conversational style, and special notes and words of caution are placed throughout. Most exercises are similar to the illustrative examples, although some are optional and specially marked to be done with a calculator. In addition, many applications of algebra used in the sciences have been included in the examples and exercises. A final examination and the answers to the odd-numbered exercises are at the end of the book. Numerous supplements are available to accompany the text: a computerized testbank of multiple-choice questions on tape or mini–floppy discs, a printed textbank of multiple-choice test questions, videotape cassettes, audiotape cassettes, an instructor's manual with tests, an