Presented is a second supplement to previous lists of references. This document is a compilation of information collected by the Calculator Information Center between December 1980 and March 1982. Included are references which previously appeared on bulletins distributed by the center, plus articles from newsletters and similar less readily available sources and from non-American sources. Most references are annotated; all include a limited set of descriptors or keywords which denote the focus or contents of the reference. At the end of the listing is an index for each descriptor. (MP)
Calculators:
A Categorized Compilation of References
Supplement 2

Marilyn N. Suydam

March 1982

Calculator Information Center
The Ohio State University
1200 Chambers Road
Columbus, Ohio 43212

The work upon which this publication is based was performed pursuant to Contract No. 400-80-0007 of the National Institute of Education. It does not, however, necessarily reflect the views of that agency.
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>List of References</td>
<td>3</td>
</tr>
<tr>
<td>Index</td>
<td>42</td>
</tr>
</tbody>
</table>
Calculators: A Categorized Compilation of References

Since March 1977, the Calculator Information Center has met the dual functions of collecting and disseminating information about the use of calculators in education. This document lists references collected by the Center between December 1980 and March 1982, supplementing two previous compilations (Suydam, 1979, 1980). The majority of these references have appeared on Reference Bulletins distributed by the Center. Two additional types of materials cited here did not appear in those bulletins:

(1) Articles from sources not readily available to wide audiences.

(2) Articles and other documents from non-American sources.

No claim to comprehensiveness is made: readers are encouraged to send additional references to the Center. Omitted are approximately 350 references pertaining to applications which seem too specialized in intent for use in schools.

The alphabetized listing of references includes, in parentheses, a limited set of descriptors or keywords which denote the focus or contents of the references. At the end of the listing is an index to help the reader locate documents of interest. However, some descriptors which could have been applied to a particular reference might not be listed. Such omissions generally occurred because the descriptor did not come to mind as the reference was scanned. It is suggested that readers might add their own notes of references appropriate in each category.

In the majority of instances, the references are annotated. In a small percentage of cases, however, no annotation is included; this occurred most often because the document was not available at the Center. The descriptors should reflect what is known about the contents of such documents, as indicated by the title.
It is hoped that this compilation will be of aid to teachers, to researchers, and to others who need and want references on calculators.

References


Calculators: A Categorized Compilation of References
(Compiled December 1980-March 1982)


Problem-solving strategies were designated for each of the four steps in a problem-solving procedure (14, 32, 4, and 10 strategies, respectively). A questionnaire designed to determine the effective use of calculators in problem solving was completed by 53 mathematics teachers. The calculator was found to be effective for 13 strategies. Overall, the calculator was more effective for carrying out the plan than for understanding the problem.

(Problem solving, Research (survey), Secondary, Teachers)


Two fourth-grade classes were randomly assigned to either a calculator or a non-calculator group, each taught concepts of average. Significant differences on the posttest favored the calculator group. The calculator was an advantage in avoiding computational errors.

(Achievement, Elementary (grade 4), Four-function calculators, Research, Statistics)

Adkins, Bryce E. Using a Calculator to Find the "Greatest Common Factor". School Science and Mathematics 81: 603-606; November 1981.

Procedures are presented for using the hand-held calculator to find the greatest common factor and the least common multiple.

(Algorithms, Four-function calculators)


(Games)


Twenty-seven third and fourth grade students with learning disabilities were randomly assigned to one of three experimental groups: a group using four-function calculators, a group using preprogrammed feedback calculators, or a control group. The two calculator groups met for 20 minutes per day for 20 school days outside regular curriculum time. They used the calculators to practice basic facts. The four-function calculator group's performance was significantly better than the other two.

(Elementary (grades 3-4), Learning disabilities, Remedial, Research)
A vice-president of Chase Manhattan Bank discusses the need for calculator skills, and a calculator approach to algebra.
(Post-secondary)

Goals involving calculators are included.
(Curriculum, Elementary, Problem solving, Programming, Related (computers), Scientific calculators, Secondary)

Antipov, I. N. The Basic Calculation Methods by Pocket Calculator Elektronika B3-18A. Moscow: Vishave Shkola, 1980.
(Activities)

This book is designed for a college mathematics course, with calculator use integrated.
(Basic mathematics, College, Scientific calculators)

Training physically and mentally handicapped students ages 8-16 to use a calculator is described and the positive outcomes of this study are cited.
(Calculator keys, Curriculum, Desk calculators, Elementary, Four-function calculators, Handicapped, Junior high, Research, Secondary)

Important features that need to be considered when selecting a programmable calculator for classroom use are discussed. In addition, ten possible uses of programmable calculators in secondary schools are suggested.
(Programmable calculators, Secondary, Selection)

The use of a slide rule is suggested to complement a four-function calculator. An inexpensive method of making a slide rule with photocopied scales is described.
(Recommendations)

Teaching young school children to use the "=" key as a counter button is explored.

(Elementary (k-1), Four-function calculators, Research (survey))


Uses of calculators (and computers) in agriculture and agricultural education are presented.

(Agriculture)


A step-by-step plan for introducing calculators in grades one through six is outlined. It includes a sequence of activities.

(Activities, Attitudes, Elementary (grades 1-6))


Methods of calculating any power or root of a number using only the $x^2$ and $\sqrt{x}$ keys are illustrated.

(Calculator keys, Powers, Roots, Scientific calculators, Secondary)


Several activities are presented that illustrate how calculators can help children understand division concepts. Remainders, estimating, and figuring averages are also discussed.

(Activities, Calculator keys, Elementary, Four-function calculators, Teachers)


Using the calculator to reinforce place value concepts is described.

(Activities, Elementary, Place value, Teachers)


This article describes how the calculator can be used to find the total sale price of an item (including tax) and annual or compound interest on a savings account.

(Activities, Calculator keys, Consumer applications, Elementary, Junior high, Teachers)
Bitter, Gary. Five, Six Math is Kicks When You Seven, Eight Calculate! Instructor 91: 130-133; September 1981.
A step-by-step guide to help teach elementary children how to use a calculator is presented.
(Activity, Elementary)

Successful calculator experiences in the clinical APL program for elementary disabled learners are described along with a method for dealing with fractions, in which decimal answers are converted to equivalent fractions.
(Curriculum, Decimals, Elementary, Fractions, Learning disabilities, Remedial)

Using the y^x (or 10^x) key on a calculator for determining the rationality of a^b is investigated. Comments on rational approximations displayed for an irrational number are also included.
(Calculator keys, Exponents, Integers, Powers, Rational numbers, Secondary)

(Activity, Elementary, Secondary)

A brief history of the development and use of the hand-held calculator is presented. Recommendations for general classroom use are made.
(Recommendations)

Studied were the effects of a planned sequence of problem-solving activities and use of calculators on problem-solving and computational performance. Calculator use did not decrease computational skills. The calculator was useful if the problems were within the scope of the child's paper-and-pencil ability. Those who had used calculators were less afraid than others to attempt difficult problems.
(Achievement, Anxiety, Attitudes, Elementary (grade 4), Four-function calculators, Problem solving, Research)

(Navigation)

Discussed are ways the calculator can be used as a tool to explore new curriculum directions such as the nature of thought.

(Algorithms, Curriculum, Calculator logic, Calculator memory, Logarithms, Recommendations, Roles)


Students in grades 11 and 12 performed mental arithmetic, problem solving without a calculator, and problem solving with a calculator, followed by rest, during which their brain activity was measured. The amounts of alpha activity between problem solving with and without a calculator were not significantly different.

(Problem solving, Research, Scientific calculators, Secondary (grades 11, 12)


(Consumer applications)


Suggestions for calculator use are mentioned within a sample lesson teaching fixed point iteration.

(Calculus, College, Iteration, Scientific calculators)


Suggestions for using the calculator as a navigational tool are given.

(Naval applications, Scientific calculators)


An algorithm for approximating square roots is analyzed. One small section deals with using a calculator to generate a table.

(Algebra, Algorithms, Calculus, Roots, Secondary)

This chapter presents NAEP data on how students performed on different types of exercises and problems when they used calculators.

(Achievement, Attitudes, Elementary (age 9), Four-function calculators, Junior high (age 13), Mixed operations, Problem solving, Related (computers), Research, Secondary (age 17))


The 1977-78 NAEP mathematics assessment provided information about performance on routine computation and problem solving when calculators were available. The data indicated that calculators are widely accessible to students at ages 9, 13, and 17. They performed routine computation better with the use of a calculator.

(Achievement, Elementary (age 9), Four-function calculators, Junior high (age 13), Mixed operations, Problem solving, Research)


Applications of the scientific calculator in science and business, featuring popular equation and calculator techniques, is presented.

(Business, Post-secondary, Science, Scientific calculators)


Pre-service elementary teachers (n = 94) were randomly assigned to one of three types of instruction: (1) teacher-guided instruction and practice with the calculator as a computational and instructional tool, (2) independent instruction whereby a calculator was provided along with reading materials related to the use of the calculator for computation and instruction, and (3) reading materials related to the calculator and its use in the elementary school. Group 1 did significantly better on the Calculator Computation Test (CCT) than group 2, and group 2 did significantly better on the CCT than group 3.

(Achievement, Attitudes, Elementary, Research, Scientific calculators, Teachers (preservice))


Deletion of certain traditional topics and the addition of new ones in the mathematics curriculum are suggested because of technology.

(Curriculum, Related (technology), Secondary)

This activity requires students to construct tables of values for use in solving maximization problems involving area. Three worksheets are provided.

(Activities, Elementary, Geometry, Junior high, Measurement, Worksheets)


(College, Statistics)

Cheung, Y. L. Equation - Solving with the Calculator. *Australian Mathematics Teacher* 37: 4; April 1981.

The trial-and-error method using the calculator is explored as a useful equation-solving strategy.

(Secondary, Solution methods)

Chirpich, Thomas P. Analysis of Student Laboratory Data - An Illustration of the Usefulness of an Inexpensive Programmable Pocket Calculator. *Journal of Chemical Education* 58: 436-437; May 1981.

An inexpensive programmable calculator is used to perform and to check calculations in an experimental situation on freezing point depression data.

(Chemistry, Programmable calculators)


(Biology, Chemistry, Programmable calculators)


Uses of calculators in the business curriculum are presented.

(Business, Curriculum)


Two classes each of kindergarten, second-, and fourth-grade students (n = 161) were designated experimental groups. First-, third-, and fifth-grade students (n = 164), who were tested the previous year using the Metropolitan Achievement Test Form F (MAT), served as the control group. The six teachers of the experimental groups participated in a workshop on calculator use and materials. During the school year, these teachers made decisions about specific activities and how frequently calculators were used. The ratio of calculators to students in the experimental classes was one to two. No significant differences in achievement between the experimental and control groups were found at the second- and fourth-grade levels. However, the kindergarten group using calculators scored significantly higher on the MAT than the group not using calculators.

(Achievement, Classroom management, Elementary, (k, 2, 4), Four-function calculators, Problem solving, Research)

A trigonometry course was developed which was dependent on the use of a calculator. A comparison of two calculator and two non-calculator trigonometry classes indicated no significant difference in mathematical achievement, no significant change in attitude toward mathematics, and significant achievement on supplementary topics by the calculator group.

(Curriculum, Research, Secondary (grades 11, 12), Trigonometry)


Calculator features are categorized as essential, useful, or unnecessary for primary school use.

(Elementary, Selection)


A unit on calculating machines is included.

(Business, Secondary, Units)


An investigational approach to mathematics is described along with the benefits of using a calculator in this type of instruction.

(Activities, Elementary, Problem solving)


Fourth-grade students from seven classrooms were assigned to three achievement levels. Each class was randomly assigned to use calculators either for all computation or only for checking problems, or was denied use of calculators. No significant differences between groups were found, but teachers reported that the calculator was motivating for students.

(Achievement, Attitudes, Elementary (grade 4), Four-function calculators, Multiplication, Research)


(Elementary, Research)


Calculators and computers are used to test the equivalence of algebraic expressions using various approximations of irrational numbers.

(Algebra, Secondary)

Students are encouraged to write their own problems to be solved with a calculator.

(Elementary, Junior high, Problem solving)


Eighth-grade students were given one form of a mathematics assessment instrument. Control students did not have access to calculators. One experimental group was issued calculators for the test and the other was allowed to bring and use calculators if desired. Only 8 of the 42 test items were a type where a calculator could be used to advantage. The use or nonuse of a calculator did not make any difference in the final result.

(Achievement, Junior high (grade 8), Research)

Edens, Helen S. Calculators in the First Grade: How Should They be Used? *Virginia Mathematics Teacher* 7: 11-14; February 1981.

See Edens, 1981.

(Achievement, Attitudes, Elementary (grade 1), Four-function calculators, Research, Teachers (in-service))


In grade 1, four calculator classes and two non-calculator classes were randomly identified. Teachers in one calculator group were given in-service education on using calculators. All groups used the same worksheets for 30 minutes each day during the 6-week study. The non-calculator group scored significantly higher on the posttest of mathematics objectives and on mathematical concepts than did the calculator group. Students whose teachers had the in-service work scored significantly higher on concepts. Teacher attitudes were more positive toward the use of calculators after the experimental period.

(Achievement, Attitudes, Elementary (grade 1), Four-function calculators, Research, Teachers (in-service))


New features of this text include the use of calculators integrated into computational problems to reinforce concepts.

(Algebra, College)


The use of calculators is integrated into computational problems.

(Algebra, Secondary (grades 11, 12), Trigonometry)

One group used the calculator for practice, while the other used paper and pencil. No significant difference was found between groups on a verbal problem-solving test. However, both groups had higher scores on the calculator version of the test.

(Achievement, Elementary (grade 6), Four-function calculators, Problem solving, Research)


Some ways to use calculators with handicapped and learning disabled children are suggested.

(Activities, Elementary, Handicapped (blind/retarded), Learning disabilities, Related (computers), Selection)


A suggested policy for the use of calculators in schools is presented with a general set of guidelines.

(Recommendations)


Undergraduates (n = 128) were randomly assigned to one of four conditions formed by crossing two levels of task difficulty (computationally easy or difficult problems) with two modes of calculation (solving by hand or calculator). When solving problems by hand, there was a larger increase in state anxiety between easy and difficult problems. However, level of anxiety on easy problems solved by hand was not lower than for difficult problems solved with a calculator.

(Anger, College, Four-function calculators, Research, Statistics)


Two detailed examples are given using programmable calculators to compute summations and averages. Other uses are suggested. Features of the Hewlett Packard 33E are reviewed.

(Activities, Programmable calculators, Statistics)

Fennell, Francis (Skip); Houser, Larry L.; McPartland, Donna; and Parker, Sandra. Ideas. Arithmetic Teacher 29: 31-36; February 1982.

Sports-oriented worksheets provide computational and problem-solving practice using fractions, decimals, and percent.

(Elementary (grades 1-6), Junior high (grades 7-8), Worksheets)

A small section discusses the impact of calculators on the mathematics curriculum and necessary reforms.

(Curriculum, Recommendations)


Calculators are used in a matter-of-fact way in this textbook. Instructions are provided to acquaint students with the capabilities of their calculators as the need arises. For students who have only a four-function calculator, primitive logarithm and trigonometry tables are included.

(Algebra, Curriculum, Scientific calculators, Secondary (grades 11-12), Trigonometry)


Trigonometry is presented without the use of log and trig tables, but rather with scientific and programmable calculators.

(Curriculum, Programmable calculators, Scientific calculators, Secondary (grades 11-12), Trigonometry)


Research on the use of the Texas Instrument Little Professor in two third-grade classes is presented. For each of the addition, subtraction, multiplication, and division scores, the achievement of the Little Professor class was significantly better than the non-calculator class.

(Elementary (grade 3), Mixed operations, Preprogrammed devices, Research)


(Biology, College, Programmable calculators)


Using a programmable calculator (HP-97) in the modelling of physiological systems is described.

(College, Programmable calculators, Programming, Science, Selection)


(Chemistry, College, Science)

Calculator exercises in this supplementary workbook deal with four topics: basic operations, money calculations, mensuration, trigonometry, and algebra.

(Activity, Algebra, Consumer applications, Measurement, Mixed operations, Secondary (grade 9), Trigonometry)


This is a textbook supplement which is intended to give ninth-grade users enough practice in basic operations so that they can use the calculator with ease and confidence in every aspect of the mathematics course. The contents are: basic operations, measurement, money calculations, trigonometry and algebra.

(Activity, Algebra, Consumer applications, Measurement, Mixed operations, Secondary (grade 9), Trigonometry)


This is a textbook supplement for tenth-grade mathematics.

(Activity, Secondary (grade 10))


(Activity)


Electronic learning aids for children are described. They include Speak & Math, non-mathematical aids, and general electronic learning aids such as Mattel's Children's Discovery System.

(Activity, Elementary, Marketing, Preprogrammed devices)


Worksheets which provide good practice in estimating answers using multiplication and division are given.

(Division, Estimation, Junior high (grades 7-9), Multiplication, Secondary (grades 10-12), Worksheets)


Instructions for constructing a calculator bin rack are given.

(Classroom management)

Marketing research disproved the notion that LCD technology was short-lived. It was outperforming all other competing display technologies and was well-accepted by consumers.

(Marketing, Related (technology), Research (survey))


The theory behind three probability puzzles is discussed. Included is a table of probabilities for matching birthdays.

(Probability)


This annotated bibliography includes a selection of relevant calculator literature available in the English language. Indexes of authors and institutions and notes on availability of publications are included.

(Elementary (grades k-6), Junior high (grades 7-8), References)


This report summarizes a study conducted by the Centre for Studies in Science Education, University of Leeds and includes: a summary of recent developments, an historical overview, current developments, and prospects, a calculator ownership survey, a middle school calculator survey, specifications for pocket calculators with an annotated bibliography, and suggestions for future developmental work.

(Curriculum, elementary, Recommendations, References (selected), Research, Status report)


Background information on the use of calculators in schools (including activities in the U.S.) are included in this comprehensive report, as well as specific suggestions for curriculum and instruction. Appendices include reports from the various Swiss cantons.

(Activities, Curriculum, References (selected), Status report)


(Calculus, College, Programmable calculators)

The teachers who had access to calculators employed the heuristic "use successive approximation" more often than students without calculators. Calculators were only beneficial for those problems in which the computation required to solve it really necessitated the use of a calculator.


Using the calculator to find starting points for geometric progressions is suggested.


(Hannah, Max and Henry, Bruce. Teaching Long Division of Decimals Using a Calculator! *Australian Mathematics Teacher* 37: 2-3; April 1981.

The use of the calculator as a teaching aid, not just a computational aid, is described. The development and actual use of a unit on the division of decimals by decimals is described.


Proper use of calculators in business education is discussed.


This first in a series of four articles explores the links that already exist between Departments of Mathematics and Science. The needs for more consultation and joint action are emphasized.


A process for developing the approximate values of the logarithms for the numbers two through nine is presented. These values are then compared with the calculator-generated logarithms.


This book explains how to build calculators and minicomputer hardware using calculator chips.

(Building, Related (computers))

Reasons for revising and updating mathematics teaching procedures and curriculum to incorporate the use of calculators are presented.

(Curriculum, Roles)


Community college students were randomly assigned to groups using one of three methods for teaching fraction computation. The first method was the use of the conventional algorithm. The second method was a combination of the algorithms and calculators for whole number calculation. In the third method each fraction was converted to a decimal on a calculator before any operations were performed. Although there were significant pretest to posttest gains in all three groups, the calculator group did not show significant gains compared to the other two. However, significant differences between the pre- and posttest scores were found.

(Achievement, Algorithms, Attitudes, College, Fractions, Research)


(College, Numerical analysis)


One section of this article considers the role of the calculator in elementary mathematics classrooms for the gifted, with respect to problem solving, estimation, and concepts.

(Curriculum, Elementary, Estimation, Gifted, Problem solving, Related (computers), Roles)


This book incorporates calculators in the algebra and trigonometry course.

(Algebra, College, Scientific calculators, Trigonometry)


The results of a comparative study which integrated calculator use into a college algebra and trigonometry course are given.

(Achievement, Algebra, Attitudes, College, Functions, Logarithms, Problem solving, Research, Scientific calculators, Trigonometry)

(Algebra, College)


Methods are presented for finding square roots, cube roots, and powers on calculators that do not have these keys. How to generate random numbers and truncate a number are also explained.

(Calculator keys, Four-function calculators)


Some issues regarding significant figures are discussed.

(Junior high, Secondary, Significant figures)


(Business, Programmable calculators)


Uses of programmable calculators include chemical simulations, testing hypotheses, repetitive calculation, monitoring experiments and games.

(Activities, Chemistry, College, Games, Programmable calculators, Secondary, Selection)


This calculator activity book includes activities in basic mathematics skills, place value, problem solving, estimation, numeration, money, patterns, recording skills, following directions, writing numbers, word recognition, and completing sentences.

(Activities, Consumer applications, Elementary, Estimation, Four-function calculators, Mixed operations, Place value, Problem solving, 'orksheets)


This calculator activity book includes concepts similar to *Calculator Blast-Off,* but contains more difficult computations.

(Activities, Elementary, Four-function calculators, Problem solving, Worksheets)


This bi-monthly column presents problems and suggestions about calculator use.

(Activities)

Methods used by eight brands of calculators in computing standard deviation are discussed.

(Calculator logic, Programmable calculators, Scientific calculators, Selection, Statistics)


A course which provides instruction in the use of a hand-held calculator is described.

(College, Course description)


The advantages to using programmable calculators in high school instead of computers are discussed.

(Activities, Programmable calculators, Pros/cons, Related (computers), Roles, Secondary)


Two calculator activities are presented which reinforce concepts and relationships introduced previously. The advantages of this approach are also discussed.

(Activities, Elementary, Estimation, Four-function calculators, Junior high, Numerical analysis, Recommendations)

Jones, Chris. 72 x 49. Mathematics Teaching 94: 8-11; March 1981.

Several advantages of using calculators to explore the multiplication algorithm are described.

(Activities, Algorithms, Elementary, Multiplication)


The role of calculators in the elementary mathematics curriculum is discussed.

(Curriculum, Elementary, Four-function calculators, Recommendations, Roles)


This consumable workbook familiarizes students with the features and use of a minicalculator. It shows how the calculator can be used to perform a variety of calculations that are part of a basal mathematics program, and is helpful for anyone who has little or no experience working with a calculator.

(Elementary (grade 6), Junior high (grades 7-9), Problem solving, Worksheets)

The new form of mathematical tables being published is explained. The advantages of such tables over calculators are discussed.

(Pros/cons)


Several advantages of programmable calculators over computers are presented. They include cost, portability, and effectiveness.

(Programmable calculators)

Klein, D. Shop with a Pocket Calculator. 50 Plus 21: 50; July 1981.

(Consumer applications)


Seven excellent problems requiring the use of logarithms are presented. They included banking, scientific, and game problems.

(Logarithms, Problem solving, Scientific calculators)


Seven calculator textbooks and two calculator puzzle books are reviewed.

(Junior high, Post-secondary, Recommendations, References (selected), Secondary)


Several general uses of calculators in the classroom are discussed. They include use as a functional tool and as a pedagogical tool. A warning against the use of a calculator for the sake of using it is issued. References on some effects, uses, and selections of calculators are cited.

(Curriculum, Roles)


One hundred fifty students enrolled in a community college arithmetic course were randomly assigned to two treatment groups. Three classes were given traditional instruction; three were instructed in the use of calculators and were allowed to use them for all classroom, homework, and testing activities. On the total posttest and on most of the sub-tests the differences between the treatment groups were not significant.

(College, Remedial, Research)
(Activities, Elementary, Secondary)

(Activities, Elementary, Secondary, Teachers)

(Activities, Elementary)

A mathematics class studied materials designed for use with a programmable calculator in grades 11 and 12. The calculator bridged the gap between formal proof and understanding a basic theorem, made discovery a viable instructional strategy, and served as a pedagogical language for student-teacher interaction.

(Course description, Programmable calculators, Research, Secondary)

A method for using the binomial theorem to approximate multiplication is presented.

(Algebra)

A program to play a simulated baseball game is presented. The statistics from the game agree well with the expected values computed from the negative binomial distribution.

(Games, Programmable calculators, Statistics)

Estimation techniques are discussed and a series of mental estimation procedures are presented. The procedures are based on the concepts of measurement and real numbers rather than on counting and integers. Techniques for teaching these procedures are described.

(Estimation, Mixed operations)

Students in grades 4 and 8 (n = 539) received brief instruction on using a calculator. Half of the students at each grade level completed mathematics subtests of the Iowa Test of Basic Skills using a calculator as an option. The same tests were given a second time without calculators. The opposite procedure was used for the other half of the students. Rates of completion at both grade levels were much lower on problem-solving and computation subtests when a calculator was available. However, computation scores increased significantly at both grade levels when calculators were used.

(Achievement, Elementary (grade 4), Four-function calculators, Junior high (grade 8), Problem solving, Research)


A collection of calculator activities for lower-ability mathematics students is presented.

(General mathematics, Junior high, Low achievers, Secondary, Teachers)


Possibilities for teaching traditional material such as analysis using calculator subroutines are illustrated.

(Calculus, College, Technical mathematics, Trigonometry)


This set of 26 supplemental calculator activities is for use with students of varying abilities in grades 5-12.

(Activities, Elementary, General mathematics, Geometry, Junior high, Measurement, Secondary)


(Selection)


A collection of activities which include a teachers' guide and worksheets. Some of them make use of calculators.

(Activities, Worksheets)


Uses of calculators in the business curriculum are presented.

(Business, Curriculum)

No significant differences were found in mathematics anxiety between students using or not using a calculator, or between male and female students using calculators.

(Algebra, Anxiety, College, Research, Scientific calculators)

Martin, Randy L.; Lowry, David P.; Nicholls, Albert W.; Schumacher, Joyce E.; Egan, Gerald V.; and Burton, Robert O., Jr. Use of Programmable Calculators for Depreciation Calculations. Circular 119. West Virginia: West Virginia University Agricultural and Forestry Experiment Station, 1981.

(Finance, Programmable calculators)


The impact of calculators in the past and in the future is discussed.

(Future (technology), Roles, Status report)


Thirty-three college students who were novice users of calculators were compared to 33 computer science majors who were expert calculator users. For each of 88 items (e.g., 2 + 3 +), students were asked to write down the number that would be in the calculator display after the last key was pressed. Experts were found to be more consistent than novices. Students differed greatly on when they thought an expression would be evaluated, the order in which a chain of calculations was evaluated, and whether the display would be incremented.

(Algorithms, Calculator logic, College, Research, Solution methods)


Support is given for the calculator as a key to the development of numeracy rather than a threat.

(Four-function calculators, Pros/cons)


Calculator units were developed for use with any standard ninth-grade general mathematics text. Students were encouraged to memorize the calculator keyboard and use it without looking.

(Calculator keys, General mathematics, Research, Secondary (grade 9) Units)

Students in grades three and five were assigned to calculator or non-calculator groups for a unit on problem solving. At the grade three level, the calculator facilitated the development of five of the seven basic skills identified in this study. At the grade five level, the results of the two groups were fairly evenly matched. The calculator had no effect on the attitude towards mathematics of the fifth grade class.

(Achievement, Attitudes, Elementary (grades 3, 5), Four-function calculators, Research)


Programmable calculators are used for scientific analysis.

(Programmable calculators, Science)


Calculators are used in this book as an aid to learning basic business mathematics.

(Business mathematics, College, Scientific calculators, Secondary)


A community college course reviewing business math and calculator skills is described.

(Business mathematics, College, Course description)


Fifth- and sixth-graders worked through calculations on their calculators until they arrived at a word answer. They then learned to design their own problems.

(Activities, Elementary (grades 5-6), Four-function calculators)


Three activity sheets requiring estimation of products, quotients, and powers in various tic-tac-toe configurations are given.

(Junior high, Secondary, Worksheets)


(Algebra, College, Numerical analysis, Secondary)
(Elementary, Pros/cons)

A study of forty right-handed high school and college students who were trained to operate calculators with their left hands while recording information with their right hands is described. Results suggest the possibility of improving speed without a significant loss of accuracy.
(College, Research, Secondary)

This collection of activities illustrates ways to develop problem solving techniques using a calculator. Techniques used include: 1) look for a pattern, 2) make a chart or organized list, and 3) guess and check.
(Activities, Four-function calculators, Problem solving)

Programmable calculators are used as an aid to active filter design.
(Programmable calculators, Related (computers))

Activities with an emphasis on problem solving are included.
(Activities, Elementary, Junior high, Problem solving, Teachers)

The availability and usage of calculators, computers, and related instructional materials are presented.
(Elementary, Junior high, Related (computers), Roles, Secondary, Status report)

Suggestions are made for displaying the set-up of a problem which is to be solved with the use of a calculator.
(Problem solving, Secondary)

Programmable calculators are discussed.


One hundred sixty-two students were divided into calculator and non-calculator groups for six weeks of problem solving study. At the end of the experiment both the experimental and the control groups were divided into calculator on posttest and pencil-paper posttest groups. The students who were provided with unrestricted use of calculators achieved higher in problem solving posttest scores and also in several of the specific components of problem solving skills. The treatment effect did not significantly affect the attitude of the students.


Calculators are used to explore functions by drawing graphs of the ordered pairs that are produced. Excellent sample worksheets and sample test questions are given.

(Olson, Melfried. It's a Factor of Life. Mathematics Teacher 73: 681-684; December 1980.

Three calculator worksheets deal with factoring positive integers and prime numbers.


Nine calculator activities for elementary school mathematics are presented.


A thematic rather than a sequential approach to mathematics is suggested for remedial mathematics courses.

(Padberg, Friedhelm F. Using Calculators to Discover Simple Theorems -- An Example from Number Theory. Arithmetic Teacher 8: 21-23; April 1981.)
Discussed is a method of discovering proofs, involving three steps: (1) guess first, (2) verify on a calculator, and (3) prove by exhausting all possible cases, with the help of a calculator or by algebraic methods.

(Papritan, James C. Pocket Calculators in the Agricultural Mechanics Curriculum. Chicago: American Society of Agricultural Engineers Paper, 1981. This paper reviews the utilization of the calculator and its mathematical applications in the agricultural mechanics/mechanization curriculum. Several strategies are proposed which will assist in the alleviation of numerous mathematical concerns by both instructors and students.


(Pashkova, L. and Oksman, V. Pocket Calculators in the Teaching Process. Profesionalno Technicheskoye Obrazovanie 5: 40-41; 1980. The following calculator programs are included: (1) table of values, (2) numerical approximation to derivative, (3) Newton's method to approximate real zeros, (4) numerical approximation for definite integral, (5) calculation of n!, (6) two approximations to the irrational number e, (7) some interesting sequences and series, and (8) the birthday problem.


The decimal representation of rational numbers is examined. A method for finding periods of length greater than eight is described.

(Rational numbers, Secondary)


An example of how the calculator can be used to compute a line by the least-square-fitting method is presented along with programming with precision of points.

(College, Programmable calculators, Programming, Science)

Pikaart, Len; Butts, Thomas; Dilley, Clyde; Kullman, David; Meiring, Steve; and Suydam, Marilyn. 1980 Ohio Regional Conferences on Mathematics Education. (NSF-funded project.) Columbus: The Ohio State University, 1980. ERIC: ED 200 421.

Half of the packet of materials is devoted to activities and suggestions for using calculators in the secondary school.

(Activities, Secondary)


(Elementary, Research, Teachers)


In this textbook the calculator is used as a support tool. Various uses are introduced as the need arises. Calculators play a minor role except in the chapter on exponentials and logarithms where their use is encouraged.

(Algebra, College, Curriculum)


The use of calculators is encouraged in computations formerly done by logarithms and in numerical trigonometry. Calculators are not necessary, however; logarithms and trigonometry tables are provided.

(Algebra, College, Curriculum, Scientific calculators, Trigonometry)


This is a set of 50 visual masters which help illustrate and explain over two dozen geometry topics.

(Geometry, Junior high (grades 7-9), Worksheets)

Ten recommendations for the use of calculators in the secondary mathematics curriculum are presented.

(Recommendations, Secondary)


Twenty-six studies and other selected sources were reviewed and annotated to determine the effects of calculator use in mathematics classes and to assess proposed curriculum revisions.

(Curriculum, Recommendations, Research (review))


This chapter describes how the programmable calculator, which stimulates random experiments, can be used in teaching probability and statistics.

(Activities, Elementary, Junior high, Probability, Programmable calculators, Secondary, Statistics)


Questions and calculator activities designed to challenge bright students in the primary grades are presented.

(Elementary (grades k-2), Games, Gifted, Pattern searches, Problem solving)


The programmable TI 59 calculator is used with conductivity measurements to familiarize students with the law of mass action, the activity coefficient, and the terms of the conductivity theory.

(College, Physics, Programmable calculators)


(College, Physics, Programmable calculators)


(Elementary, Research)

(Astronomy, Post-secondary)


Two basic mathematics classes were randomly assigned to be experimental groups (n = 126), while one class was the control group (n = 38). In the experimental groups, the calculator was used in demonstrations and discussions to aid learning about functions. In the control group, calculator use was allowed but not required or encouraged. No significant differences in achievement were found between groups.

(Achievement, College, Functions, Research, Units)


One experimental and one control group from each of two schools offering electronics programs within a major department of engineering technology studies were used. The experimental groups were exposed to formalized training in the use of hand-held calculators early in their first semester, using a calculator training manual. At the completion of the training period a test was administered. The findings of the study indicated formalized training resulted in superior test performance for the experimental group.

(College, Engineering, Research)


The teaching of statistical physics through the use of the quantum shuffling game on programmable calculators and microcomputers is described.

(College, Physics, Programmable calculators)


This report discusses the development and evaluation of methods of teaching problem solving while incorporating calculators.

(Curriculum, Elementary (grades 5-6), Junior high (grades 7-8), Problem solving)

Information about specific brands of calculators is presented. The types of calculators discussed are: combination display/printing, display, mini, and printing.

(Business education, Desk calculators, Four-function calculators, Marketing, Preprogrammed devices, Programmable calculators, Selection)


Four treatments were compared: (1) using the computer managed instructional support system (ISS), (2) using calculators, (3) using both calculators and ISS, and (4) using neither calculators nor ISS. Students in calculator groups achieved significantly better than those in non-calculator groups, and had significant improvement in positive attitudes toward mathematics.

(Achievement, Algebra, Attitudes, College, Related (computers), Research, Scientific calculators)


(Curriculum)


No significant differences were found between groups using or not using calculators, with respect to mathematical applications and computational skills.

(Achievement, Four-function calculators, Junior high (grade 7), Research)


(Activities, Elementary, Secondary)


Calculator use in navigation is described.

(Navigation, Post-secondary, Scientific calculators)


Shumway endorses Weaver's article and adds recommendations of his own.

(Recommendations)

Software for calculators available through SCS is described.

(Programmable calculators, Related (computers), Selection)


Calculator algorithms that approximate Gaussian and chi square probabilities are presented.

(Algorithms, College, Probability, Statistics)


Three calculator activity sheets are included to reinforce skills in solving linear equations, estimation, and mental computation.

(Activities, Algebra, Junior high, Secondary, Worksheets)


Supplementary problem-solving activities are included.

(Activities, Games, Programmable calculators, Related (computers))


This collection of papers was presented at the 1980 NCTM meeting. The articles support the use of programmable calculators and indicate specific ways in which they can be used.

(Curriculum, Problem solving, Programmable calculators, Programming, Secondary)


A one-term calculator-based course in mathematics for junior college students needing remediation was designed. The calculator-based curricular modules helped some students in problem solving. The calculator seemed to be highly motivational, and gave students confidence to proceed in areas of mathematics they had never before explored.

(Achievement, Algebra, College, Course description, Problem solving, Remedial, Research, Scientific calculators)

Students in grades 4-6 (n = 146) were divided into four groups: calculator with special or standard materials and non-calculator with special or standard materials. Following daily instruction consisting of 10 problems to solve, a posttest of worded problem-solving ability was given. Students in the calculator/special materials group scored significantly lower than students in other groups. This group, however, completed the instructional materials in a significantly shorter average time than other groups.

(Achievement, Elementary (grades 4-6), Four-function calculators, Problem solving, Research, Units)


Three examples are given in which a calculator cannot directly calculate an answer; it would usually indicate an error. With a little thought a student can enter the problem in a different way to obtain a correct answer.

(Activities, Algebra, Calculator keys, Secondary)


Detailed information on the organization, presentation, and content of a college level calculator usage course is provided.

(College, Course description, Scientific calculators)


The following topics are discussed in the Third Annual State-of-the-Art Review prepared by the Calculator Information Center: recommendations for the 1980's, evidence on availability and uses of calculators, surveys on beliefs and attitudes, and development of instructional materials.

(Status report)


References on calculators compiled between June 1979 and December 1980 are listed, with categories indexed.

(References)


The four Information Bulletins prepared during 1980 and 1981 present uses of calculators in secondary mathematics, activities for use at home (grades 4-8), 67 ten-minute activities (grades 4-8), and 25 activities for teaching computation with calculators.

(Activities, Elementary (grades 1-6), Junior high (grades 7-8), Secondary)

Fifteen research reports on calculator use are abstracted and critiqued by mathematics educators.

(References, Research (review))


The four Reference Bulletins cited articles, books, dissertations, and other materials compiled by the Center during 1980 and 1981.

(References)


Status reports from August 1980 and August 1981 are included.

(Status report)


This Third Annual State-of-the-Art Review discusses recommendations for the 1980's, evidence on availability and uses of calculators, surveys on beliefs and attitudes, and development of instructional materials.

(Status report)


Twelve research reports on calculator use are abstracted and critiqued by mathematics educators.

(References, Research (review))

Suydam, Marilyn N. Update on Research on Problem Solving: Implications for Classroom Teaching. _Arithmetic Teacher_ 29: 56-60; February 1982.

The effects of calculator use on problem-solving strategies and achievement in problem solving are discussed.

(Problem solving, Research)


This editorial makes the point that finding formulas in textbooks, substituting numerical values, and computing answers with a calculator can lead to learning a substantial amount of physics.

(Physics, Roles, Scientific calculators, Secondary)

Students in grades 5-7 (n = 116) were given calculators for use in mathematics classes. They were randomly assigned to one of two modes of completing the problem-solving posttest: using calculators or using paper and pencil. In a second section of the posttest, the groups were reversed, so that all students took a test in both modes. Three of eight comparisons of correct solutions significantly favored the calculator mode of problem solving. On measures of problems attempted and methods correct, all differences were nonsignificant except three favoring the calculator mode.

(Elementary (grades 5-6), Four-function calculators, Junior high (grade 7), Problem solving, Research)


Students in grades 3, 5, 7, and 8 were randomly assigned to calculator or non-calculator instruction. At each grade level one teacher taught both groups using regular materials and texts, supplemented by additional materials for the calculator groups. On tests of computational skills and problem solving on which all students used only paper and pencil, there were no significant differences. However, on a problem-solving test where calculators were used, the seventh- and eighth-grade groups using calculators scored significantly higher than paper-and-pencil groups.

(Elementary (grades 3, 5), Four-function calculators, Junior high (grades 7, 8), Problem solving, Research)


This report contains the two previously cited studies, one on using calculators in grades 5 to 7 (1981a) and one on their use in grades 3, 5, 7, and 8 (1981b).

(Elementary (grades 3, 5, 6), Four-function calculators, Junior high (grades 7, 8), Problem solving, Research)


The types of error which may be made in calculator computations are discussed. Appropriate checking techniques for calculator usage are presented.

(Checking, Estimation)


The willingness of students to accept unreasonable answers from calculators is discussed.

(Estimation, Junior high (grades 7-9), Research, Secondary (grades 10-12)

A procedure is presented for determining test reliability on a calculator.

(Scientific calculators, Teachers (in-service), Testing)


A collection of sixty-five short calculator-activities appropriate for students in grades five through nine is presented.

(Activities, Elementary (grades 5-6), Junior high (grades 7-9))


Research on the use of calculators by kindergarten and elementary children is described.

(Elementary (grades k-6), Recommendations, Research)


(College, Engineering, Programmable calculators, Statistics)


This material was produced for use with low-achieving students aged 13 to 15. It is designed to be cut up to form 16 small "topic booklets".

(Low achievers, Secondary)


This chapter is a somewhat subjective distillation of the essence of consequential research findings to date on calculator use in school settings, the implications of such findings for classroom instruction, and some indication of research directions that need to be taken during the 1980s. It supports the NCTM recommendations on calculator use.

(Elementary, Junior high, Recommendations, Research (summary), Roles, Secondary)


Calculator algorithms are used to illustrate and suggest ways in which calculators can facilitate unary operations at the pre-algebra level.

(Algorithms, Calculator keys, Functions, Iteration, Junior high)

Two different designs of RPN calculators are compared: in one the contents of the T register are always retained; in the other, the contents of the T register are lost whenever the problem involves a stack of more than three levels.

(Calculator logic, Calculator memory)


The criteria for determining the appropriate number of significant digits in calculator computations is investigated.

(Science, Secondary, Significant figures)


Programming techniques for programmable calculators are illustrated.

(Programmable calculators, Programming)


A study in which 35 visually impaired adults were given training in basic arithmetic skills with a talking calculator is described. There was an eighty-seven percent improvement in mean posttest scores over mean pretest scores.

(Basic mathematics, Handicapped (blind), Research)

Wiebe, James H. *Using a Calculator to Develop Mathematical Understanding.* Arithmetic Teacher 29: 36-38; November 1981.

Methods are described for using the four-function counting calculator for developing understanding of the meaning of square roots and basic operations on whole and rational numbers. The refinement of estimates is used.

(Activities, Elementary (grades 3-6), Estimation, Four-function calculators, Mixed operations)


This article shows how the complex equations for a specific three-body problem can be solved on a small programmable calculator. A calculator program that performs iterations is presented in a small section.

(College, Iteration, Programmable calculators, Science)

This is a collection of calculator games and activities that reinforce mathematical skills and concepts.

(Activities, Elementary, Games)


Procedures and instructional advantages for learning the language of different makes and models of calculators are outlined.

(Calculator keys, Calculator logic, Calculator memory)

Williams, David E. Calculator Activities. *Instructor* 90: 154-158; February 1981.

Five calculator games for elementary and junior high students are included.

(Elementary, Games, Junior high, Teachers)

Williams, David E. Test Your Calculator IQ. *Teacher* 68-70; February 1981.

A quiz to test "calculator IQ" is presented; it can prepare teachers for the questions about calculators students typically ask.

(Elementary, Four-function calculators, Junior high, Teachers)


This editorial is a call for a whole-hearted re-appraisal of the mathematics curriculum to incorporate the micro-processor. It is necessary to develop the mathematical skills required for computing devices to be used intelligently in problem solving.

(Recommendations)


Interesting examples showing the use of calculators with arithmetic, square roots, graphs, equations, and trigonometry are given.

(Activities, Algebra, Functions, Junior high, Mixed operations, Roots, Secondary, Trigonometry)


Activities making use of the constant arithmetic feature of many calculators are described in detail. This feature is recommended for elementary school use.

(Activities, Calculator keys, Elementary, Four-function calculators, Selection)

NCTM's An Agenda for Action recommends that the mathematics curriculum take full advantage of the power of calculators and computers. The significance of this recommendation to middle schoolers is discussed in one small section.

(Recommendations)


A little problem demonstrating the use of a calculator is presented with a straightforward solution and a more difficult solution.

(Four-function calculators, Junior high (grade 7), Problem solving)


(Technical mathematics)

To a Beginning with a Calculator in Instruction. Dusseldorf, West Germany: Padagogischer Verlag Schwann, 1980.

(Activities)


This is a set of worksheets organized specifically for teaching basic arithmetic with the use of a calculator.

(Elementary (grades 1-6), Worksheets)


(Activities)


Ideas for using calculators in schools are given.

(Activities)


The algorithm used to calculate square roots on the Casio Memory 8 calculator is given.

(Algorithms, Roots, Scientific calculators)

Consumer Reports 45: 295-300; December 1980.

(Selection)


(Selection)

Some activities for calculator experimentation are presented.

(Activities, Secondary)


This project investigated the effect of placing one programmable calculator in each of five remedial mathematics labs and one in a special needs mathematics classroom. Teachers recommended continued use of the calculator, and regarded it as an effective motivator. Students' attitudes were positive toward use of the calculator, and they experienced "feelings of accomplishment in mathematics."

(Attitudes, Learning disabilities, Programmable calculators, Remedial, Research, Secondary, Technical mathematics)


Suggested practice exercises for students in the use of calculators. Many lessons require that students look for patterns and write rules for those observed. Recommended for grades seven through nine.

(Junior high (grades 7-9), Pattern searches, Worksheets)


Describes the use of the four-function calculator and reviews basic number sequences and operations. Recommended for grades four through six.

(Elementary (grades 4-6), Four-function calculators, Kit)


A list of references selected for easy availability and direct relevance to the classroom is provided.

(References (selected)


(Elementary, Pros/cons, Secondary)

Four discussions on calculators are presented: the situation at the international level, the current situation in Canada, extension of a project in England, and calculator accuracy. The appendix is a detailed synthesis of the national reports on calculator usage by 16 countries.

(Status report)


The rationale for the use of calculators in the classroom, the history of simple calculators, and some characteristics of various calculators are discussed. Three sample lessons are given.

(Pros/cons, Recommendations, Selection, Worksheets)

Start Your Motors! Aardvard Calculator Math Program. Walnut Creek, California: Aardvard Media, 1975.

(Activities)


The results of a survey of 140 mathematics educators concerning the use, availability and desirability of calculators are given.

(Elementary (grades 4-6), Junior high, Pros/cons, Research (survey), Secondary, Status report)
INDEX

This index is designed to help the user locate references to designated areas of concern related to the use of calculators in education. It should be noted that the cross-referencing is not exhaustive: there may be other references which could be pertinent, but have been omitted due to oversight.

The following topics are included in the index:

Achievement
Activities
Agriculture
Algebra
Algorithms
Anxiety
Astronomy
Attitudes
Basic mathematics
Biology
Building
Business
Business education
Business mathematics
Calculator keys
Calculator logic
Calculator memory
Calculus
Checking
Chemistry
Classroom management
College
Consumer applications
Course description
Curriculum
Decimals
Desk calculators
Division
Electronic learning
Elementary
Engineering
Estimation
Exponents
Finance
Four-function calculators
Fractions
Functions
Future (technology)
Games
General mathematics
Geometry
Gifted
Handicapped
Integers
Iteration
Junior high
Kit
Learning disabilities
Logarithms
Low achievers
Marketing
Measurement
Mixed operations
Multiplication
Naval applications
Navigation
Nondecimal bases
Numerical analysis
Pattern searches
Physics
Place value
Post-secondary
Powers
Preprogrammed devices
Prime numbers
Probability
Problem solving
Programmable calculators
Programming
Proofs
Pros/cons
Rational numbers
Recommendations
References
Related (technology)
Remedial
Research
Roles
Roots
Science
Scientific calculators
Secondary
Selection
Significant figures
Solution methods
Statistics
Status report
Teachers
Technical mathematics
Technical occupations
Testing
Trigonometry
Units
Worksheets

Australia
Belgium
Denmark
England
Switzerland
USSR
West Germany

* * * * * * * * * * * * * * * * * * * * * * * * *

Achievement

Abo-Elkhair, 1981
Brey, 1980
Carpenter et al., 1981a, b
Casterlow, 1981
Conner, 1979
Dean, 1981
Dye, 1982
Edens, 1981a, b
Elliott, 1981
Hector and Frandsen, 1981
Hestenes and Hill, 1981b
Lewis and Hoover, 1981
McNicol and LeMaistre, 1981
Rule, 1981
Sharma, 1981
Shivel, 1981
Steinback, 1980
Stewart, 1981

Activities (continued)

Jones, 1981
Lund, 1981
Maletsky and Hirsch, 1981
Miller, G., 1981
Morris, 1981
Moursund, 1980
O’Neil and Jensen, 1982
Papritan, 1981a
Pashkova and Oksman, 1980
Pask, 1981
Pikaart et al., 1980
Råde, 1981
Shkil et al., 1980
Smith, 1981
Snover and Spikell, 1981
Storer, 1980
Suydam, 1981a
Usiskin, 1979
Wiebe, 1981
Williams, 1980
Winkles, 1981
Woodward, 1981
To a Beginning ..., 1980
A Calculator Croswoord ..., 1981
The Calculator Goes ..., 1981
Diversions, 1979
Start ..., 1975

Agriculture

Bentley, 1980
Papritan, 1981a

Algebra

Carmony, 1981
Dolan, 1981

* * * * * * * * * * * * * * * * * * * * * * * * *
Algebra (continued)
Elich and Elich, 1982a, b
Flanders and Price, 1981a
Gatford and Pitman, 1979, 1981
Hestenes and Hill, 1981a, b, 1982
Lange, 1980
Martin, 1980
Minaeva and Oksman, 1980
Padberg, 1981
Price and Flanders, 1982 a, b
Sharma, 1981
Smith, 1981
Steinback, 1980
Storer, 1980
Winkles, 1981

Algorithms
Adkins, 1981
Brown and Rising, 1980-81
Carmony, 1981
Hector and Frandsen, 1981
Jones, 1981
Mayer and Bayman, 1981
Sletten, 1980
Weaver, 1981b
Casio, 1977

Anxiety
Brey, 1980
Fabrey and Robe:s, 1981
Martin, 1980

Astronomy
Romanovskis and Revunov, 1979

Attitudes (continued)
Murphy, 1981
Sharma, 1981
Exploration ..., 1979

Basic mathematics
Ash and Robinson, 1981
Weiss and Weiss, 1981

Biology
Clarke, 1982
Francevich, 1979

Building
Haviland, 1977

Business
carter and Huzan, 1979
Clayton, 1978
Crousen, 1980
Marcharik, 1981
Hohenstein, 1981
Marcellino, 1978

Business education
Seldon and Jorgensen, 1981

Business mathematics
Merchant, 1980a, b

Calculator keys
Bailey, 1980
Birnbaum, 1981
Bitter, 1981a, c
Blume, 1981
Hill, 1979
McDonald, 1980
Storer, 1980
Weaver, 1981b
Williams, 1981a
Woodward, 1981
Calculator logic

Brown and Rising, 1980-81
Huff and Carter, 1981
Mayer and Bayman, 1981
Weaver, 1981c
Williams, 1981a

Calculator memory

Brown and Rising, 1980-81
Weaver, 1981c
Williams, 1981a

Calculus

Butts, 1981
Carmony, 1981
Grinfeld, 1978
Haigh, 1981
Lukacs, 1980
Peller, 1981
Petrov, 1979

Checking

Thompson, 1981

Chemistry

Chirpich, 1981
Clarke, 1982
Garcia, 1981
Holdsworth, 1980

Classroom management

Conner, 1979
Gourdouze, 1981

College (continued)

Garcia, 1981
Grinfeld, 1978
Haigh, 1981
Hector and Frandsen, 1981
Henrici, 1982
Hestenes and Hill, 1981a, b, 1982
Holdsworth, 1980
Hyatt, 1982
Koop, 1982
Lukacs, 1980
Martin, 1980
Mayer and Bayman, 1981
Merchant, 1980a, b
Minaeva and Oksman, 1980
Morgan et al., 1981
Pace, 1981
Peller, 1981
Petrov, 1979
Picot, 1980
Price and Flanders, 1981a, b
Rechberger and Linert, 1981
Riggi, 1981
Rule, 1981
Rynone, 1981
Sauer, 1981
Sharma, 1981
Sletten, 1980
Steinback, 1980
Sutliff, 1981
Volk, 1982
Wild, 1980

Consumer applications

Bitter, 1981c
Burkhardt, 1977
Gatford and Pitman, 1979, 1981
Hollombe and Lubin, 1979
Klein, 1981

Course description

Hyatt, 1982
Krist, 1981
Merchant, 1980b
Steinback, 1980
Sutliff, 1981
Curriculum

Allenbrand et al., 1979
Bailey, 1980
Block, 1980
Brown and Rising, 1980-81
Chang, 1980
Clayton, 1978
Connor, 1981
Fielker, 1981
Flanders and Price, 1981a, b
Gregory, 1981b
Gretler, 1980
Hayes, 1980
Hersberger and Wheatley, 1980
Judd, 1975
Koop, 1979
Marcellino, 1978
Pace, 1978
Price and Flanders, 1982a, b
Rabe, 1981
Schoen et al., 1980
Shelton, 1981
Spikell, 1980

Decimals

Block, 1980
Hannah and Henry, 1981

Desk calculators

Bailey, 1980
Seldon and Jorgensen, 1981

Division

Goodman, 1982

Electronic learning

Goodman, 1981

Elementary

Abo-Elkhair, 1981
Albina, 1981
Allenbrand et al., 1979
Bailey, 1980
Behr and Wheeler, 1981

Elementary (continued)

Bestgen, 1981
Bitter, 1981a, b, c, d
Block, 1980
Boltanskii, 1979
Brey, 1980
Carpenter et al., 1981a, b
Casterlow, 1981
Channell, 1981
Conner, 1979
Cramery, 1979
Davies, 1980
Dean, 1981
Decraene and Plancke-Schuyten, 1981
Duea and Ockenga, 1982
Edens, 1981a, b
Elliott, 1981
Etlinger and Ogletree, 1981
Fennell et al., 1982
Foster, 1979
Goodman, 1981
Gregory, 1981a, b
Hannah and Henry, 1981
Hersberger and Wheatley, 1980
Hollombe and Lubin, 1979, 1980
Johnson, 1981
Jones, 1981
Judd, 1975, 1977
Lewis and Hoover, 1981
Lund, 1981
McNicol and LeMaistre, 1981
Miller, G., 1981
Moiseeva, 1979
Moursund, 1980
Moursund and East, 1979
O’Neil and Jensen, 1982
Padberg, 1981
Parkhurst, 1981
Pashkova and Oksman, 1980
Plancke-Schuyten and Decraene, 1980
Råde, 1981
Rathmell and Leutzinger, 1981
Romanovskis, 1980
Schoen et al., 1980
Shkil et al., 1980
Stewart, 1981
Suydam, 1981a
Szetei, 1981a, b, c
Usiskin, 1979
van den Brink, 1981

49
Elementary (continued)
Weaver, 1981a
Wiebe, 1981
Williams, 1980, 1981b, c
Woodward, 1981
Calculator Activity Worksheets, 1980
Los Angeles ..., 1985
Microcalculators ..., 1980-81
Victorian ..., 1979

Engineering
Rynone, 1981
Volk, 1982

Estimation
Goodman, 1982
Hersberger and Wheatley, 1980
Hollombe and Lubin, 1979
Johnson, 1981
Levin, J., 1981
O'Neil and Jensen, 1982
Thompson, 1981
Timnick, 1982
Weibe, 1981

Exponents
Blume, 1981

Finance
Martir et al., 1981

Four-function calculators (continued)
Abo-Elkhair, 1981
Adkins, 1981
Bailey, 1980
Behr and Wheeler, 1981
Bitter, 1981a
Brey, 1980
Carpenter et al., 1981a, b
Conner, 1979
Dean, 1981
Edens, 1981a, b
Elliott, 1981
Four-function calculators (continued)
Fabrey and Roberts, 1981
Hill, 1979
Hollombe and Lubin, 1979, 1980
Johnson, 1981
Judd, 1975
Lewis and Hoover, 1981
McCrae, 1979
McNicol and LeMaistre, 1981
Miller, G., 1981
Morris, 1981
O'Neil and Jensen, 1982
Selden and Jorgensen, 1981
Shively, 1981
Stewart, 1981
Szetela, 1981a, b, c
Wiebe, 1981
Williams, 1981c
Woodward, 1981
Writt, 1981
Los Angeles ..., 1975

Fractions
Block, 1980
Hector and Frandsen, 1981

Functions
Hestenes and Hill, 1981b
Murray, 1979
Rule, 1981
Weaver, 1981b
Winkles, 1981

Future (technology)
Martino, 1980

Games
Adler et al., 1981
Hamilton, 1981
Holdsworth, 1980
Levin, E., 1981
Pask, 1981
Rathmell and Leutzinger, 1981
Snover and Spikell, 1981
Williams, 1980, 1981b
<table>
<thead>
<tr>
<th>Section</th>
<th>Authors/Referees</th>
<th>Year(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>General mathematics</td>
<td>Lichtenberg, 1981</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lund, 1981</td>
<td></td>
</tr>
<tr>
<td></td>
<td>McDonald, 1980</td>
<td></td>
</tr>
<tr>
<td>Geometry</td>
<td>Channell, 1981</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lund, 1981</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Frigge et al., 1981</td>
<td></td>
</tr>
<tr>
<td>Gifted</td>
<td>Hersberger and Wheatley, 1980</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rathmell and Leutzinger, 1981</td>
<td></td>
</tr>
<tr>
<td>Handicapped</td>
<td>Bailey, 1980</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Etlinger and Ogletree, 1981</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Weiss and Weiss, 1981</td>
<td></td>
</tr>
<tr>
<td>Integers</td>
<td>Blume, 1981</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Olson, 1980</td>
<td></td>
</tr>
<tr>
<td>Iteration</td>
<td>Butts, 1981</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Weaver, 1981b</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wild, 1980</td>
<td></td>
</tr>
<tr>
<td>Junior high</td>
<td>Bailey, 1980</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bitter, 1981c</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Carpenter et al., 1981a, b</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Channell, 1981</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Duea and Ockenga, 1982</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dye, 1982</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fennell et al., 1982</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Goodman, 1982</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gregory, 1981</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hannah and Henry, 1981</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hirst, 1980</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Johnson, 1981</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Judd, 1977</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Knowles, 1981</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lewis and Hoover, 1981</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lichtenberg, 1981</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lund, 1981</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Miller, W., 1981</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moursund, 1980</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moursund and East, 1979</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Murphy, 1981</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Olson, 1980</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Parkhurst, 1981</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prigge et al., 1982</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Råde, 1981</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Schoen et al., 1980</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shively, 1981</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Smith, 1981</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Suydam, 1981a</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Szetela, 1981a, b, c</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Timnick, 1982</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Usiskin, 1979</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Weaver, 1981a, b</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Williams, 1981b, c</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Winkles, 1981</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Writt, 1981</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Los Angeles ..., 1976</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Victorian ..., 1979</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Los Angeles ..., 1975</td>
<td></td>
</tr>
<tr>
<td>Learning disabilities</td>
<td>Albina, 1981</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Block, 1980</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Etlinger and Ogletree, 1981</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Exploration ..., 1979</td>
<td></td>
</tr>
<tr>
<td>Logarithms</td>
<td>Brown and Rising, 1980-81</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hartman, 1981</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hestenes and Hill, 1981b</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kluepfal, 1981</td>
<td></td>
</tr>
<tr>
<td>Low achievers</td>
<td>Lichtenberg, 1981</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Watson, 1980</td>
<td></td>
</tr>
</tbody>
</table>
Marketing

Goodman, 1981
Grabis, 1981
Selden and Jorgensen, 1981

Measurement

Channell, 1981
Gatford and Pitman, 1979, 1981
Lund, 1981

Mixed operations

Carpenter et al., 1981a, b
Foster, 1979
Gatford and Pitman, 1979, 1981
Hollombe and Lubin, 1979
Levin, J., 1981
Wiebe, 1981
Winkles, 1981

Multiplication

Dean, 1981
Goodman, 1982
Jones, 1981

Naval applications

Campbell, 1980

Navigation

Brogdon, 1980
Shufeldt and Newcomer, 1980

Nondecimal bases

Haigh, 1981

Numerical analysis

Henrici, 1982
Johnson, 1981
Minaeva and Oskman, 1980
Padberg, 1981

Pattern searches

Haigh, 1981
Hannah and Henry, 1981
Olson, 1980
Rathmell and Leutzinger, 1981
Los Angeles ..., 1976

Physics

Rechberger and Linert, 1981
Riggi, 1981
Sauer, 1981
Swartz, 1981

Place value

Bitter, 1981b
Hollombe and Lubin, 1979
O'Neil and Jensen, 1982

Post-secondary

Allen, 1980
Carter and Huzan, 1979
Knowles, 1981
Romanovskis and Revunov, 1979
Shufeldt and Newcomer, 1980

Powers

Birnbaum, 1981
Blume, 1981

Preprogrammed devices

Foster, 1979
Goodman, 1981
Selden and Jorgensen, 1981

Prime numbers

Olson, 1980
**Probability**

Green, 1981
Peller, 1981
Råde, 1981
Sletten, 1980

**Problem solving**

Abdelsamad, 1981
Allenbrand et al., 1979
Brey, 1980
Buchanan, 1981
Carpenter et al., 1981 a, b
Davies, 1980
Duea and Ockenga, 1982
Elliott, 1981
Gross, 1980
Hersberger and Wheatley, 1980
Hestenes and Hill, 1981 b
Hollombe and Lubin, 1979, 1980
Judd, 1977
Kluepfel, 1981
Lewis and Hoover, 1981
Morris, 1981
Moursund, 1980
Mulhearn, 1980
Murphy, 1981
Rathmell and Leutzinger, 1981
Schoen et al., 1980
Spikell, 1980
Steinback, 1980
Stewart, 1981
Suydam, 1982b
Szetal, 1981 a, b, c
Witt, 1981

**Programmable calculators**

Bailey, 1974
Chirpich, 1981
Clarke, 1982
Fearnley-Sander, 1979
Flanders and Price, 1981 b
Francevich, 1979
Gaar, 1980
Grinfeld, 1978
Hohenstälin, 1981
Holdsworth, 1980
Huff and Carter, 1981
Inglis, 1981
Kissane, 1980
Krist, 1981

**Programmable calculators (continued)**

Levin, E., 1981
Martin et al., 1981
Meck, 1981
Moschyte, 1981
Mullish and Kochan, 1980
Papritan, 1981 b
Peller, 1981
Picot, 1980
Råde, 1981
Rechberger and Linert, 1981
Riggi, 1981
Sauer, 1981
Selden and Jorgensen, 1981
Simons and Harden, 1981
Snover and Spikell, 1981
Spikell, 1980
Volk, 1982
Weir, 1981
Wild, 1980
Exploration ..., 1979

**Programming**

Allenbrand et al., 1979
Gaar, 1980
Peller, 1981
Picot, 1980
Spikell, 1980
Weir, 1981

**Proofs**

Padberg, 1981

**Pros/cons**

Inglis, 1981
Kaner, 1981
McCrae, 1979
Moiseeva, 1979
Papritan, 1981 a
Microcalculators ..., 1980-81
SMTS, 1981
Victorian ..., 1979

**Rational numbers**

Blume, 1981
Phillips, 1979
Recommendations

Barelski, 1981
Block, 1980
Bone, 1981
Brown and Rising, 1980-81
Evans, 1980
Fielker, 1981
Gregory, 1981b
Johnson, 1981
Judd, 1975
Papritan, 1981a
Rabaey, 1979
Rabe, 1981
Shumway, 1981
van den Brink, 1981
Weaver, 1981a
Willis, 1979
Woodward, 1981
SMTS, 1981

References

Gregory, 1981a, b
Gretler, 1980
Knowles, 1981
Suydam, 1980, 1981b, c, 1982a
Mathematical Association, 1981

Related (technology)

Allendbrand et al., 1979
Carpenter et al., 1981
Chang, 1980
Etlinger and Ogletree, 1981
Grabis, 1981
Haviland, 1977
Hersberger and Wheatley, 1980
Inglis, 1981
Moschytz, 1981
Moursund and East, 1979
Sharma, 1981
Simmons and Harden, 1981
Snover and Spikell, 1981

Remedial

Albina, 1981
Block, 1980
Koop, 1982
Pace, 1981
Steinback, 1980

Remedial (continued)

Exploration ..., 1979

Research

Abdelsamad, 1981
Abo-Elkhair, 1981
Albina, 1981
Bailey, 1980
Behr and Wheeler, 1981
Brey, 1980
Buchanan, 1981
Carpenter et al., 1981a, b
Casterlow, 1981
Connor, 1979--
Connor, 1981
Dean, 1981
Decraene and Plancke-Schuyten, 1981
Dye, 1982
Edens, 1981a, b
Elliott, 1981
Fabrey and Roberts, 1981
Foster, 1979
Grabis, 1981
Gregory, 1981b
Gross, 1980
Hannah and Henry, 1981
Hart, 1981
Hector and Frandsen, 1981
Hestenes and Hill, 1981b
Koop, 1982
Kristol, 1981
Lewis and Hoover, 1981
Martin, 1980
Mayer and Bayman, 1981
McDonald, 1980
McNicol and LeMaistre, 1981
Morgan et al., 1981
Murphy, 1981
Parkhurst, 1981
Plancke-Schuyten and Decraene, 1980
Rabe, 1981
Romanovskis, 1980
Rule, 1981
Rynone, 1981
Sharma, 1981
Shively, 1981
Steinback, 1980
Stewart, 1981
Suydam, 1981b, 1982a, b
Szetela, 1981a, b, c
Research (continued)

Timnick, 1982
van den Brink, 1981
Weaver, 1981a
Weiss and Weiss, 1981
Exploration ..., 1979
Victorian ..., 1979

Roles

Brown and Rising, 1980-81
Hayes, 1980
Hersberger and Wheatley, 1980
Inglis, 1981
Judd, 1975
Koop, 1979
Martino, 1980
Moursund and East, 1979
Swartz, 1981
Weaver, 1981a

Science

Carter and Huzan, 1979
Gaar, 1980
Garcia, 1981
Meck, 1981
Picot, 1980
Webb, 1980
Wild, 1980

Scientific calculators

Allenbrand et al., 1979
Ash and Robinson, 1981
Birnbaum, 1981
Buchanan, 1981
Bitts, 1981
Campbell, 1980
Carter and Huzan, 1979
Casterlow, 1981
Flanders and Price, 1981a, b
Gross, 1980

Scientific calculators (continued)

Haigh, 1981
Harcharik, 1981
Hartman, 1981
Hestenes and Hill, 1981a, b
Huff and Carter, 1981
Kluelpfeli, 1981
Martin, 1980
Merchant, 1980a
Murray, 1979
Price and Flanders, 1982b
Sharma, 1981
Steinback, 1980
Sutliff, 1981
Swartz, 1981
Tokar and Ruggles, 1981
Casio, 1977

Secondary

Abdelsamad, 1981
Allenbrand et al., 1979
Bailey, 1974, 1980
Birnbaum, 1981
Blume, 1981
Boltanskii, 1979
Buchanan, 1981
Carmony, 1981
Carpenter et al., 1981
Chang, 1980
Cheung, 1981
Connor, 1981
Crouzen, 1980
Dolan, 1981
Elich and Elich, 1982b
Flanders and Price, 1981a, b
Goodman, 1982
Harcharik, 1981
Hart, 1981
Hirst, 1980
Holdsworth, 1980
Inglis, 1981
Knowles, 1981
Kovalev and Shvarcburd, 1976, 1978
Krist, 1981
Lichtenberg, 1981
Lund, 1981
McDonald, 1980
Merchant, 1980a
Miller, W., 1981
Minaeva and Oksman, 1980
Secondary (continued)

Morgan et al., 1981
Moursund and East, 1979
Mulhearn, 1980
Murray, 1979
Parkhurst, 1981
Pashkova and Oksman, 1980
Peller, 1981
Phillips, 1979
Pikaart et al., 1980
Rabaey, 1979
Rāde, 1981
Shkil et al., 1980
Smith, 1981
Skipp, 1980
Storer, 1980
Suydam, 1981a
Swartz, 1981
Timnick, 1982
Watson, 1980
Weaver, 1981a
Webb, 1980
Winkles, 1981
Divisions, 1979
Exploration ... , 1979
Microcalculators ... , 1980-81
Victorian ... , 1979

Selection

Bailey, 1974
Cramery, 1979
Etlinger and Ogletree, 1981
Gaar, 1980
Holdsworth, 1980
Huff and Carter, 1981
Magells, 1980
Selden and Jorgensen, 1981
Simmons and Harden, 1981
Woodward, 1981
Consumer Reports, 1980
Consumer's Research, 1981
SMTS, 1981

Significant figures

Hirst, 1980
Webb, 1980

Solution methods

Cheung, 1981
Mayer and Bayman, 1981

Statistics

Abo-Elkhair, 1981
Chapin, 1980
Fabrey and Roberts, 1981
Fearnley-Sander, 1979
Huff and Carter, 1981
Levin, E., 1981
Rāde, 1981
Slatten, 1980
Tokar and Ruggles, 1981
Volk, 1982

Status report

Gregory, 1981b
Gretler, 1980
Martino, 1980
Moursund and East, 1979
Suydam, 1980-81, 1981d, e
Proceedings ... , 1981
Victorian ... , 1979

Teachers

Abdelsamad, 1981
Bitter, 1981a, b, c
Casterlow, 1981
Edens, 1981a, b
Gross, 1980
Harcharik, 1981
Kovalev and Shvarcburd, 1978
Lichtenberg, 1981
Moursund, 1980
Plancke-Schuyten and Decraene, 1980
Tokar and Ruggles, 1981
Williams, 1981b, c

Technical mathematics

Lukacs, 1980
Yob, 1981
Exploration ... , 1979
Technical occupations

Papritan, 1981b

Testing

Tokar and Ruggles, 1981

Trigonometry

Connor, 1981
Elich and Elich, 1982b
Flanders and Price, 1981a, b
Gatford and Pitman, 1979, 1981
Hestenes and Hill, 1981a, b
Lukacs, 1980
Price and Flanders, 1982b
Winkles, 1981

Units

Crousen, 1980
Hannah and Henry, 1981
McDonald, 1980
Rule, 1981
Stewart, 1981

Worksheets

Channell, 1981
Fennell et al., 1982
Goodman, 1982
Hollombe and Lubin, 1979, 1980
Judd, 1977
Maletsky and Hirsch, 1981
Miller, W., 1981
Murray, 1979
Olson, 1980
Prigge et al., 1981
Smith, 1981
Calculator Activity Worksheets, 1980
Los Angeles ..., 1976
SMTS, 1981

Australia

Cheung, 1981
Cramery, 1979
Evans, 1980
Fearnley-Sander, 1979

Australia (continued)

Foster, 1979
Hannah and Henry, 1981
Hayes, 1980
Hill, 1979
Inglis, 1981
Kissane, 1980
Koop, 1979
Lange, 1980
McCrae, 1979
Mulhearn, 1980
Murray, 1979
Phillips, 1979
Storer, 1980
Willis, 1979
Diversions, 1979

Belgium

Rabaey, 1979

Denmark

van den Brink, 1981

England

Bailey, 1974, 1980
Birnbaum, 1981
Burkhard, 1977
Fielker, 1981
Green, 1981
Gregory, 1981a, b
Haigh, 1981
Hamilton, 1981
Hart, 1981
Hirst, 1980
Johnson, 1981
Jones, 1981
Kaner, 1981
Knowles, 1981
Levin, J., 1981
Lukacs, 1980
Shelton, 1981
Thompson, 1981
Watson, 1980
Webb, 1980
Winkles, 1961
Calculator Activity Worksheets, 1980
England (continued)

Mathematical Association, 1981

Switzerland

Gretler, 1980

USSR

Antipov, 1980
Boltanskii, 1979
Francevich, 1979
Gilde and Altrichter, 1980
Grinfeld, 1978
Kovalev and Shyarcyburd, 1976, 1978, 1979
Minaeva and Oksman, 1980
Moiseeva, 1979
Pashkova and Oksman, 1980
Petrov, 1979
Romanovskis, 1980
Romanovskis and Revunov, 1979
Shkil et al., 1980
Microcalculators ..., 1980-81

West Germany

To a Beginning ..., 1980