



TEXAS INSTRUMENTS HOME COMPUTER

MILLIKEN MATH SEQUENCES:

SUBTRACTION EDUCATION

SOLID STATE CARTRIDGE

A self-paced subtraction "tutor" to help your child develop strong math skills to meet today's and tomorrow's challenges. Suitable for children from kindergarten through grade eight.

8 - 6 = 4

A large red number 9 is partially visible on the left side of the page.

A large pink rectangular box is positioned below the equals sign and the number 4, intended for the user to enter the answer.

Quick Reference Guide

To take full advantage of the features and benefits of this cartridge, please read this manual completely. Important keystroke sequences are summarized here for your quick reference.

- | | |
|------------------|---|
| ENTER | Proceeds to next problem or continues problem after an incorrect answer has been given. Proceeds to the next step of a problem in the "Let Me Help You" feature. Also used to enter Beginning Level and Name. |
| SPACE BAR | Tells the computer you want to use the regrouping (borrowing) option. |
| E | Tells the computer you want to quit ("exit") the work session or leave a particular level. |



Milliken Math Sequences: Subtraction

This Solid State Cartridge is designed to be used with the Texas Instruments Home Computer. One in a series of twelve cartridges, it can help your child develop the strong math skills needed in today's and tomorrow's world. Suitable for children from kindergarten through grade eight.

Programmed by: John Plaster

Copyright © 1982 by Texas Instruments Incorporated
Program and database contents

copyright © 1982 by Texas Instruments Incorporated

See important warranty information at back of book.

A NOTE TO PARENTS

Children need strong math skills to solve today's and tomorrow's problems. The Milliken Math Sequences, along with the TI Home Computer, can help your child meet these challenges. The series allows children to work at their own pace and on the skill level at which they need practice. Children find that learning with the computer is fun, challenging, and motivating. The computer never tires of repetition or loses patience—it's like having a private math tutor!

The Milliken Math Sequences, developed for Texas Instruments by Milliken Publishing Company, consists of twelve Solid State Cartridges. Each cartridge concentrates on a different skill area in mathematics, such as addition, subtraction, decimals, or fractions. By providing different levels of difficulty, the series is suitable for children from the kindergarten age through grade eight.

The Subtraction cartridge is divided into 54 levels of difficulty, covering material generally taught in kindergarten through grade six. The program provides practice in subtracting whole numbers (numbers with no fractional part). Children begin subtracting one-digit numbers and advance level by level until they work problems involving five-digit numbers. Problems are presented both vertically and horizontally. At certain levels children practice "regrouping" ("borrowing") of numbers from one column to another.

The Subtraction cartridge offers several special features that increase its motivational and reinforcement value:

- Colorful, rewarding graphics and sound effects that appear in response to correct answers.
- An unthreatening, try-again approach to incorrect answers.
- A progress report posted at the bottom of the screen.
- Periodic reviews to maintain skill mastery.
- A “help” feature that displays the problem step by step until the final answer is found.
- Advancement to the next level if problems are answered correctly, or automatic return to a lower level if your child needs more practice.
- A special regrouping feature to help students understand the concept of borrowing from one column to another.
- Report screens personalized with your child’s name at the end of each level’s activities.
- An “Exit” screen with a complete report on your child’s score at the end of the work session.

YOUR CHILD AND THE COMPUTER

The Texas Instruments computer is a rugged, durable device designed for easy use and care. Teach your child to give the computer the same good care and respect he or she would give a television set, record player, or any piece of electronic equipment:

1. Keep snacks and beverages away from the console.
2. Don't hammer on the keyboard or place heavy objects on it.
3. Don't touch the cartridge contacts. These are recessed in the cartridge to help prevent accidental soiling and/or damage.

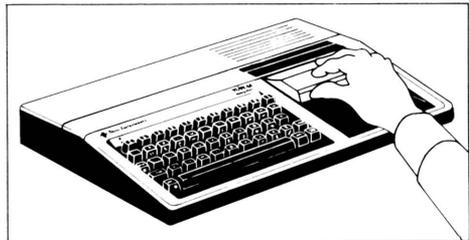
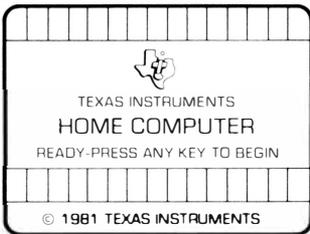
The letters and numbers on the keyboard are arranged in the same order found on standard typewriter keyboards. If your child is not familiar with a typewriter or has not used the computer before, take a few minutes to acquaint him or her with the keyboard. Point out the row of number keys at the top and the rows of letter keys below. Show your child how to insert the cartridge and how to select the activities. This brief "tour" of the computer will help reinforce the correct procedures for your child and instill confidence as he or she starts out in a new world of computers.

Today computers are involved in almost every aspect of life. Working with this cartridge can help your child become familiar with computers and their operation. Since computer-aided instruction is more common in the classroom every year, this knowledge can give your child an important advantage.

USING THE SOLID STATE CARTRIDGE

An automatic reset feature is built into the computer. When a cartridge is inserted into the console, the computer returns to the master title screen. All data or program material you have entered will be erased.

Note: Be sure the cartridge is free of static electricity before inserting it into the computer (see page 15).



1. Turn the computer ON, and wait for the master title screen to appear. Then slide the cartridge into the slot on the console.
2. Press any key to make the master selection list appear. To select the cartridge, press the key corresponding to the number beside MILLIKEN on the list.

Note: To remove the cartridge, *first* return the computer to the master title screen by pressing **QUIT**. *Then* remove the cartridge from the slot. If you have any problem inserting the cartridge, or if it is accidentally removed from the slot while in use, please see "In Case of Difficulty" on page 15.

A SAMPLE ACTIVITY

For easy use, directions are displayed on the screen throughout all the levels. This sample activity, however, can help to illustrate the way the program works.

Let's Begin

When the Milliken title screen appears, press any key to begin. The screen then prompts you to enter the Beginning Level. Select any level from 1 to 54 by typing the number and then pressing **ENTER**. For this example, press **3** and **ENTER**. Next, the screen asks for Name. Type your child's name (up to ten letters long) and then presses **ENTER**.

Now a subtraction problem is displayed on the screen. A flashing question mark shows where the answer will go, and the directions on the screen tell you to "Enter the correct number." A progress report appears across the bottom of the screen, with the following meanings:

PL	=	Problem Level
TC	=	Total Correct
TP	=	Total Problems
AVG	=	Average

As your child works through the problems, these figures are updated to report his or her progress. TC, TP, and AVG are automatically reset to zero at the beginning of each level.

Entering Answers

Let your child answer a few problems as you observe. He or she simply presses the correct number from the top row of keys. If the answer to be entered is more than one digit, the right-most digit must be entered first, as indicated by the flashing question mark. In other words, problems must be solved from right to left, just as they would be in the traditional pencil-and-paper method. This method reinforces the correct order of problem solution. (When selecting Beginning Level numbers, enter from left to right.)

How the Computer Responds

If the problem is answered correctly, an animated picture appears. Your child then presses **ENTER** to continue to the next problem. If the problem is answered incorrectly, the computer returns a screen message and encourages your child to press **ENTER** to try again. If a second incorrect answer is given, the screen border turns red and flashes. To continue, your child presses **ENTER** again, and the computer gives the answer, with a message to “Study the Answer.” When your child presses **ENTER** again, the next problem appears.

Advancing or Moving Back

If your child answers five of the previous six problems correctly, a “Good News” report is displayed. He or she then advances to the next level. If three problems in a row are answered incorrectly, a “Bad News” report appears, and your child moves back one level.

Changing Levels

You can change levels any time the question mark is flashing. To leave this level, simply press the letter **E** for “exit.” An “Exit” screen appears, which reports on your child’s progress. Press **ENTER** to return to the title screen.

Let’s try another level. Press any key to go to the “Levels 1-54” screen. This time, enter **24** (from left to right) as the Beginning Level. Then type your child’s name again, and press **ENTER** to continue.

Regrouping

At Level 24 your child is given the choice of regrouping (borrowing) visually on the screen or of regrouping mentally without displaying the process. To use the regrouping option, press the **SPACE BAR** when instructed on the screen. A small question mark appears above the column from which the value is being borrowed or taken. Type the new value for that digit. Then a small question mark appears beside the column to which the value is being regrouped. Type in this number (it will be a **1**), subtract the digits in that column, and type the answer. Finish the problem using the new value for the digit from which it was “borrowed”.

If a problem has regrouping more than once, you must press the **SPACE BAR** the first time the option is offered on the screen if you want to use the option. The regrouping option is offered whenever appropriate in Levels 7, 14 through 17, 20 through 21, and 24 through 54 (no regrouping in Level 32).

“Let Me Help You”

Now let's try the “Let Me Help You” feature. On the next problem, deliberately enter a wrong answer twice. When the border flashes red, press **ENTER** and the message “Let Me Help You” is displayed. Keep pressing **ENTER** as the computer completes the problem step by step until the final answer is found. Thus, if your child has difficulty with a particular problem, the computer demonstrates the solution for him or her.

Continue to observe as your child works through the problems and gains familiarity with the program's operations.

SKILL LEVELS

This chart can help you find the appropriate starting level for your child. By looking at the sample problems and the skill description, select a level that is not too easy, but also not too difficult, for him or her. If in doubt, start at a lower level and work up from there. You may wish to select a REVIEW level first to see if your child has mastered the skill levels up to that point. A glossary is provided on page 14.

Level	Sample Problem	Skill Description
1	$6 - 2 = ?$	Subtracting with minuends from 2 through 6.
2	$\begin{array}{r} 5 \\ - 2 \\ \hline ? \end{array}$	
3	REVIEW	
4	$9 - 4 = ?$	Subtracting with minuends from 1 through 9.
5	$\begin{array}{r} 6 \\ - 0 \\ \hline ? \end{array}$	
6	REVIEW	
7	$\begin{array}{r} 10 \\ - 3 \\ \hline ? \end{array}$	Subtracting with 10 as the minuend. Regrouping (Level 7).
8	$10 - 4 = ?$	
9-10	$8 + ? = 10$	Finding missing addends. Sums from 1 through 10.
11-12	$10 - ? = 7$	Finding missing subtrahends. Minuends from 1 through 10.

TEXAS INSTRUMENTS HOME COMPUTER

Level	Sample Problem	Skill Description
13	$12 - 5 = ?$	Subtracting with minuends from 10 through 13; subtrahends from 2 through 9. Regrouping (Level 14); some regrouping (Level 15).
14	$\begin{array}{r} 12 \\ - 8 \\ \hline ? \end{array}$	
15	REVIEW	
16	$14 - 5 = ?$	Subtracting with minuends from 14 through 18; subtrahends from 4 through 9.
17	$\begin{array}{r} 13 \\ - 8 \\ \hline ? \end{array}$	
18-19 20-21	$12 - 5 = ?$	Subtracting with minuends from 10 through 18; subtrahends from 2 through 9. Some regrouping (Levels 20-21).
	$\begin{array}{r} 11 \\ - 5 \\ \hline ? \end{array}$	
22	$? - 4 = 12$	Subtracting with minuends from 10 through 19; subtrahends from 0 through 9. Missing minuends. No regrouping.
23	$\begin{array}{r} 44 \\ - 23 \\ \hline ?? \end{array}$	Subtracting with minuends from 20 through 99; subtrahends from 20 through 99. No regrouping.
24-25	$\begin{array}{r} 31 \\ - 8 \\ \hline ?? \end{array}$	Subtracting with minuends from 20 through 99; subtrahends from 2 through 9. Regrouping tens to ones.

Subtraction

Level	Sample Problem	Skill Description
26-27	$\begin{array}{r} 42 \\ - 27 \\ \hline ?? \end{array}$	Subtracting with minuends from 21 through 99; subtrahends from 13 through 99. Regrouping tens to ones.
28	$\begin{array}{r} 40 \\ - 17 \\ \hline ?? \end{array}$	Subtracting with minuends from 20 through 90 (0 in ones place). Subtrahends from 11 through 89. Regrouping tens to ones.
29-31	$\begin{array}{r} 48 \\ - 23 \\ \hline ?? \end{array}$	Subtracting with minuends from 20 through 99; subtrahends from 2 through 99. Some regrouping tens to ones.
32	$\begin{array}{r} 478 \\ - 123 \\ \hline ??? \end{array}$	Subtracting with minuends from 200 through 900; subtrahends from 100 through 900. No regrouping.
33-34	$\begin{array}{r} 438 \\ - 174 \\ \hline ??? \end{array}$	Subtracting with minuends from 200 through 999; subtrahends from 100 through 899. Regrouping hundreds to tens.
35	$\begin{array}{r} 481 \\ - 137 \\ \hline ??? \end{array}$	Subtracting with minuends from 200 through 999; subtrahends from 100 through 899. Regrouping hundreds to tens OR tens to ones.

TEXAS INSTRUMENTS HOME COMPUTER

Level	Sample Problem	Skill Description
36-37	$\begin{array}{r} 493 \\ - 147 \\ \hline ??? \end{array}$	REVIEW: Subtracting with minuends from 200 through 999; subtrahends from 20 through 999. Some regrouping.
38-39	$\begin{array}{r} 413 \\ - 287 \\ \hline ??? \end{array}$	Subtracting with minuends from 200 through 999; subtrahends from 100 through 999. Regrouping twice.
40	$\begin{array}{r} 600 \\ - 178 \\ \hline ??? \end{array}$	Subtracting with minuends from 200 through 900 (0 in ones and tens place). Subtrahends from 100 through 999. Regrouping twice.
41-43	$\begin{array}{r} 435 \\ - 89 \\ \hline ??? \end{array}$	REVIEW: Subtracting with minuends from 200 through 999; subtrahends from 20 through 999. Regrouping.
44	$\begin{array}{r} 4134 \\ - 678 \\ \hline ???? \end{array}$	Subtracting with minuends from 1000 through 9999; subtrahends from 100 through 999. Regrouping three times.
45-46	$\begin{array}{r} 7134 \\ - 2865 \\ \hline ???? \end{array}$	Subtracting with minuends from 1000 through 9999; subtrahends from 1000 through 9999. Regrouping three times.

Subtraction

Level	Sample Problem	Skill Description
47	$\begin{array}{r} 4000 \\ - 1356 \\ \hline \end{array}$????	Subtracting with minuends from 1000 through 9000 (0 in ones, tens, and hundreds place). Subtrahends from 1000 through 8999. Regrouping three times.
48-50	$\begin{array}{r} 4781 \\ - 2356 \\ \hline \end{array}$????	REVIEW: subtracting with minuends from 1000 through 9999; subtrahends from 1000 through 9999. Regrouping.
51	$\begin{array}{r} 61472 \\ - 8983 \\ \hline \end{array}$?????	Subtracting with minuends from 10,000 through 99,999; subtrahends from 1000 through 9999. Regrouping four times.
52-54	$\begin{array}{r} 71826 \\ - 24371 \\ \hline \end{array}$?????	Subtracting with minuends from 100 through 99,999; subtrahends from 20 through 99,999. Regrouping.

GLOSSARY

addend: A number to be added to another; for example, $\text{ADDEND} + \text{ADDEND} = \text{SUM}$.

digit: Any of the numerals 0 to 9; for example, the numeral "986" has three digits.

minuend: A number from which a number (subtrahend) is to be subtracted; for example,
 $\text{MINUEND} - \text{SUBTRAHEND} = \text{DIFFERENCE}$.

regrouping: A process in subtraction by which numbers are formed into a new grouping, depending on their place values (units, tens, hundreds, etc.). This process has traditionally been called "borrowing."

subtrahend: A number that is subtracted from a minuend; the second number in a subtraction problem.

sum: Total or result of adding numbers (addends) together; for example,
 $\text{ADDEND} + \text{ADDEND} = \text{SUM}$.

CARING FOR THE CARTRIDGE

These cartridges are durable devices, but they should be handled with the same care you would give any other piece of electronic equipment. Keep the cartridge clean and dry, and don't touch the recessed contacts.

CAUTION:

The contents of a Solid State Cartridge can be damaged by static electricity discharges.

Static electricity build-ups are more likely to occur when the natural humidity of the air is low (during winter or in areas with dry climates). To avoid damaging the cartridge, just touch any metal object (a doorknob, a desk lamp, etc.) before handling the cartridge.

If static electricity is a problem where you live, you may want to buy a special carpet treatment that reduces static build-up. These commercial preparations are usually available from local hardware and office supply stores.

IN CASE OF DIFFICULTY

If the cartridge activities do not appear to be operating properly, return to the master title screen by pressing **QUIT**. Withdraw the cartridge, align it with the cartridge opening, and reinsert it carefully. Then press any key to make the master selection screen appear. (*Note:* In some instances, it may be necessary to turn the computer off, wait several seconds, and then turn it on again.)

If the cartridge is accidentally removed from the slot while the cartridge contents are being used, the computer may behave erratically. To restore the computer to normal operation, turn the computer console off, and wait a few seconds. Then, reinsert the cartridge, and turn the computer on again.

If you have any difficulty with your computer or cartridge, please contact the dealer from whom you purchased the unit and/or cartridge for service directions.

Additional information concerning use and service can be found in your *User's Reference Guide*.

THREE-MONTH LIMITED WARRANTY HOME COMPUTER SOFTWARE CARTRIDGE

Texas Instruments Incorporated extends this consumer warranty only to the original consumer purchaser.

WARRANTY COVERAGE

This warranty covers the electronic and case components of the software cartridge. These components include all semiconductor chips and devices, plastics, boards, wiring and all other hardware contained in this cartridge ("the Hardware"). This limited warranty does not extend to the programs contained in the software cartridge and in the accompanying book materials ("the Programs").

The Hardware is warranted against malfunction due to defective materials or construction. **THIS WARRANTY IS VOID IF THE HARDWARE HAS BEEN DAMAGED BY ACCIDENT, UNREASONABLE USE, NEGLIGENCE, IMPROPER SERVICE OR OTHER CAUSES NOT ARISING OUT OF DEFECTS IN MATERIALS OR WORKMANSHIP.**

WARRANTY DURATION

The Hardware is warranted for a period of three months from the date of the original purchase by the consumer.

WARRANTY DISCLAIMERS

ANY IMPLIED WARRANTIES ARISING OUT OF THIS SALE, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO THE ABOVE THREE-MONTH PERIOD. TEXAS INSTRUMENTS SHALL NOT BE LIABLE FOR LOSS OF USE OF THE HARDWARE OR OTHER INCIDENTAL OR CONSEQUENTIAL COSTS, EXPENSES, OR DAMAGES INCURRED BY THE CONSUMER OR ANY OTHER USER.

Some states do not allow the exclusion or limitation of implied warranties or consequential damages, so the above limitations or exclusions may not apply to you in those states.

LEGAL REMEDIES

This warranty gives you specific legal rights, and you may also have other rights that vary from state to state.

PERFORMANCE BY TI UNDER WARRANTY

During the above three-month warranty period, defective Hardware will be replaced when it is returned postage prepaid to a Texas Instruments Service Facility listed below. The replacement Hardware will be warranted for three months from date of replacement. Other than the postage requirement, no charge will be made for replacement.

Ti strongly recommends that you insure the Hardware for value prior to mailing.

TEXAS INSTRUMENTS CONSUMER SERVICE FACILITIES

*U.S. Residents:
Texas Instruments Service Facility
P.O. Box 2500
Lubbock, Texas 79408*

*Canadian Residents:
Geophysical Services Incorporated
41 Shelley Road
Richmond Hill, Ontario, Canada L4C5G4*

Consumers in California and Oregon may contact the following Texas Instruments offices for additional assistance or information.

*Texas Instruments Consumer Service
831 South Douglas Street
El Segundo, California 90245
(213) 973-1803*

*Texas Instruments Consumer Service
6700 Southwest 105th
Kristin Square, Suite 110
Beaverton, Oregon 97005
(503) 643-6758*

IMPORTANT NOTICE OF DISCLAIMER REGARDING THE PROGRAMS

The following should be read and understood before purchasing and/or using the software cartridge.

TI does not warrant that the Programs will be free from error or will meet the specific requirements of the consumer. The consumer assumes complete responsibility for any decision made or actions taken based on information obtained using the Programs. Any statements made concerning the utility of the Programs are not to be construed as express or implied warranties.

TEXAS INSTRUMENTS MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, REGARDING THE PROGRAMS AND MAKES ALL PROGRAMS AVAILABLE SOLELY ON AN "AS IS" BASIS. IN NO EVENT SHALL TEXAS INSTRUMENTS BE LIABLE TO ANYONE FOR SPECIAL, COLLATERAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH OR ARISING OUT OF THE PURCHASE OR USE OF THE PROGRAMS AND THE SOLE AND EXCLUSIVE LIABILITY OF TEXAS INSTRUMENTS, REGARDLESS OF THE FORM OF ACTION, SHALL NOT EXCEED THE PURCHASE PRICE OF THE SOFTWARE CARTRIDGE. MOREOVER, TEXAS INSTRUMENTS SHALL NOT BE LIABLE FOR ANY CLAIM OF ANY KIND WHATSOEVER BY ANY OTHER PARTY AGAINST THE USER OF THE PROGRAMS.

Some states do not allow the exclusion or limitation of implied warranties or consequential damages, so the above limitations or exclusions may not apply to you in those states.

Texas Instruments invented the integrated circuit,
the microprocessor, and the microcomputer.
Being first is our tradition.



TEXAS INSTRUMENTS
INCORPORATED

DALLAS, TEXAS