## Ef Andthrafic

by

## E.Z. Software

in cooperation with


## E Arcilamatic

by

# Raymond La Barbera 

## Software for the HP 48SX Calculator

Program and Manual Written and Conceived by<br>Raymond La Barbera and E.Z. Software"

> E.Z. Arithmetic ${ }^{\mathrm{m}}$ Package Marketed and Distributed
> by
> SMI Corporation

The author wishes to dedicate E.Z. Arithmetic" to his wife Stevie LaiLa Barbera who so patiently and lovingly tolerated his many late night programming and uriting sessions and to his friend Tom O'Brien who has been such a steadfast and loyal friend during the last three decades.

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We welcome comments, suggestions for improvement, criticisms, bug reports and correspondence about the E.Z. Arithmetic ${ }^{\text {n/ }}$ program software and manual. We will consider all such correspondence in preparing possible future versions of E.Z. Arithmetic ${ }^{\text {m }}$. Please address all letters to:

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Please fill out the registration card that was enclosed in your E.Z. Arithmetic ${ }^{71}$ package. This will enable us to keep you posted about possible future versions and upgrades. Please send all registration cards to:

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## Chapter One

Basics

## WHAT'S IN THIS CHAPTER

This chapter is designed to familiarize you with the features of the HP 48SX calculator you'll need to make full use of all the features of E.Z. Arithmetic.

The Hewlett Packard 48SX calculator is without doubt the most powerful calculator ever produced. With 256 K of built-in ROM, expansability to nearly 300 K of RAM, the capability of accepting plug-in ROM cards [such as E.Z. Arithmetic] and the ability to do symbolic algebra and calculus as well as to solve a bewildering array of mathematical, scientific, statistical and financial problems, the HP 48SX is more powerful than such early computers as the ATARI 800 , Commodore 64 and Apple IIe, and is almost as powerful as an IBM XT computer. The HP 48SX is actually a fully programmable scientific calculator with the power of a computer.

But all this power comes with a price. Just as learning how to operate an IBM computer can be a long, drawn out process, leaming to make full use of the HP 48SX requires quit a bit of time and study. Most people find the thought of wading through 850 pages of User Manual and learning how to program to be a most daunting prospect. This is especially true of people who have a fear of computers and electronic gadgets, bad experiences with math or simply a very short supply of time, patience and energy. Such people would rather simply type in a few numbers and immediately get the correct answer.

These are the people for whom E.Z. Arithmetic was created. With E.Z. Arithmetic, you can use your HP 48SX to learn Arithmetic without ever having to open the HP Owner's Manual. We've designed a simple, very easy-to-use, logically organized system of menus that enable you to quickly zip from one feature of E.Z. Arithmetic to another.

Within the next few pages, we'll tell you everything you need to know: about the HP 48SX to make full use of E.Z. Arithmetic. We'll show you how to locate any key you need to press. We'll explain everything you need to know about menus and display screens and how to get from one to another. We'll teach you how to enter, edit and delete numbers.

Before we proceed with these basics, we'd like to encourage you to look through the HP Owner's Manual from time to time. As we said above, you don't need to do so to use E.Z. Arithmetic. However, you may later on find learning about the stack, custom menus and various other goodies a fascinating adventure, especially if you browse through the manual a bit at a time. It's just possible that you may find that creating a program, even a little, tiny one, is a lot of fun as well as a source of great satisfaction.

Now, let's begin our adventure!!!

## LOCATING KEYS

The HP 48SX has a keyboard consisting of 49 keys arranged in nine rows. There are six keys in each of the four upper rows and five keys in each of the five lower rows.

Row 1 consists of six white-topped keys closest to the display screen. The next row, beginning on the left with the key labelled MTH and ending on the right with the key labelled NXT, is row 2 . The last row, all the way down at the bottom, beginning with the key labelled ON and ending on the right with the key labelled + is row 9 . A good way to remember this is that the numbering of the rows is exactly the same as the order in which the lines of a book are read - from top to bottom.

In each row, key 1 is the key at the left side of the keyboard and key 5 or 6 is the key at the right side. So, the key labelled ON is key 1 in row 9 . The key labelled + is also in row 9 but it is key 5 . The key labelled NXT is key 6 in row. 2 . A good way to remember this is that the order of the keys in a row is exactly the same as the order in which the words of a line in a book are read - from left to right.

So, when you are asked to press the ENTER key [row 5, key I, you'll need to go down to the fifth row and look for the first key. There, you'll find the key labelled ENTER. This is the one you need to press. If you are asked to press the 6 key [row 7, key 4], you'll need to go down to the seventh row and look for the fourth key from the left. There you'll find the one labelled 6. This is the one you need to press.

We will consistently use this system throughout the E.Z. Arithmetic Manual to help you find any key that needs to be pressed when using E.Z. Arithmetic to do a problem.

## E.Z. ARITHMETIC MENU SCREENS


E.Z. Arithmetic makes extensive use of menu screens such as the one shown above to help you get quickly and easily from one type of problem to another. Each menu screen makes use of two types of menus: the menu bar and the menu options.

## The Menu Bar or Menu Line

The menu bar or menu line is the row of small blue rectangles at the bottom of the display screen. Let's refer to each of these rectangles as menu buttons. Most menu screens have six menu buttons in the menu bar, but quite a few have fewer than six and some even have none. Each menu button has a label printed in white giving some indication of the button's function.

The Fraction Menu Screen shown above has six menu buttons in the menu bar. They are labelled: NEXT, PREV, STAK, KILL, MAIN and OFF. We'll find out in Chapter 2 what these keys actually do.

The menu buttons are controlled by the top row of white-topped keys nearest to the screen display. Each menu button is controlled by the white-topped key directly below it. To press or activate the menu button labelled NEXT, press the first, leftmost key in the first row. Later, we'll simply ask you to press the NEXT key [row 1, key 1]. To press or activate the menu button labelled STAK, press the third key in the first row. Later, we'll simply ask you to press the STAK key [row 1, key 3].

We'll use this system consistently throughout the E.Z. Arithmetic Manual any time you need to press or activate a menu button on the menu bar.

## The Mena Options

The menu options are the choices listed on the menu screen under the
title and above the menu bar. Each option is preceded by a digit, the first option being numbered 1 and each succeeding option being numbered 2,3 , $4,5,6,7,8,9$ and 0 as needed. Choosing an option leads to another menu screen or to a number input screen. No matter which option you pick, E.Z. Arithmetic will always take you to the correct successor screen.

The Fraction Menu Screen shown on the previous page has five options beginning with "1. Basics" and ending with "5. Drill". To select option 1, the Basics option, you need to locate the key labelled 1. Go down to the eighth row and then look for the second key. There, you'll find the key labelled 1. Press this key and whatever option 1 is supposed to do will happen. Later, we'll simply ask you to press the 1 key [row 8, key 2]. To select option 5, the Drill option, go down to the seventh row and look for the third key. This is where you'll find the key labelled 5. Press this key to have option 5 do whatever it is supposed to do. Later, we'll simply ask you to press the 5 key [row 7, key 3].

We'll use this system consistently throughout the E.Z. Arithmetic Manual anytime you need to select an option on a menu screen.

## Printing an E.Z. Arithmetic Screen

An E.Z. Arithmetic menu screen can be printed on an HP 82240 infrared printer as follows:

1. Turn on the printer and set it down on a flat surface.
2. Press the orange LEFT-SHIFT key [row 7, key 1].
3. Press the MTH key [row 2, key 1].
4. Set the HP48SX down so that its upper screen end is facing the bottom end of the printer.
5. Press the ENTER key [row 5, key 1 ] to begin printing.
6. Press the ON [row 9, key I] key to cancel printing before commencement or to stop printing before completion.

## Some Final Comments

All this information about screens is presented for your information. Please bear in mind that, while this information may be helpful and interesting, it's not essential for using E.Z. Arithmetic. The most important thing to remember about any screen is to read what it says and act accordingly. If the screen presents choices, read what choices are available and then press the key corresponding to your selection. If the screen asks you to enter a number, select your number, type it and press the ENTER key [row

5, key 1. Should you press a key in error, you'll never end up more than a few keypresses away from where you wanted to be. No matter what appears on the screen, the main thing is to read what is displayed and act accordingly.

## Some Notes on Sleep and Death

Due to various technical aspects of the HP 48SX, there are occasions during which E.Z. Arithmetic will seem to be taking a nap. For instance, It takes a few seconds from the time you see the E.Z. Arithmetic Title Screen to get to the Main Menu Screen. This is the amount of time needed to set things up so that E.Z. Arithmetic can do its work efficiently. It takes a few seconds from the time you press the KIILL key [row 1, key3] on any screen whose menu bar contains this button to leave E.Z. Arithmetic and restore the HP 48SX to its original state before you started the program. However, if you've had E.Z. Arithmetic running for a long time, it might well take longer to leave the program. If so, please be patient.

By the way, the HP 48SX displays a little hourglass figure at the top of the screen near the right comer to let you know that it's busy carrying out your last instructions. When the hourglass figure disappears, you'll then be able to make another selection or do another problem.

Many people do not realize that all computers, calculators and programs have defects or bugs, usually very subtle ones that the user will never encounter. It's practically impossible to build a computer or calculator or to urite a program which is $100 \%$ perfect. The more power and complexity which are involved, the greater the likelihood that there will be bugs.

While the HP 48SX and E.Z. Arithmetic work perfectly $99.99 \%$ of the time, it's possible that some strange sequence of key presses could trigger one of these subtle bugs and cause the calculator to 80 into a coma. If your HP 48SX remains asleep for more than, say, a half hour, you can assume it's in a coma. Here's how to bring it out of its coma. Press the ON key [row9, key I] and keep it depressed. While the ON key continues to be depressed, press the key [row 1, key3] just to the left of the letter "C". Release both keys and the HP 48SX will wake up ready for business. You don't even need to give it coffee! To return to the E.Z. Arithmetic program, follow the start-up procedure described on Page 2-2 of Chapter 2.

## E.Z. ARITHMETIC NUMBER INPUT SCREENS

We now explain everything you need to know about entering, editing and deleting numbers on an E.Z. Arithmetic Number Input Screen.

## Number Input Screen Basics

When you get to a number input screen, you'll see a blinking or flashing arrow-shaped mark near the bottom right comer of the display screen. This flashing mark is called the number input cursor or simply the cursor. Each time you type a digit, decimal point or something else, it will appear at the cursor position on the display screen and the cursor will then move one place to the right. The cursor always marks the position at which what you next type will appear.

Each number input screen has a message in the middle of the screen asking you to enter a number. If you are not asked to type a whole number, a positive number or some other kind of number, you may type any kind of number you wish. If you type the urong kind of number or type something that is not a number, E.Z. Arithmetic will tell you that you made an emror and ask you to try again.

If you get to a number input screen by mistake or if you change your mind, you can press the ON key [row 9 , key 1 to abort the number entry process. You'll be taken back to the screen you left in coming to the number input screen.

## Entering Numbers

No matter what problem you call upon E.Z. Arithmetic to solve, you'll need at some point to enter one or more numbers. This process, which is similar to the way in which numbers are entered on most calculators and computers, involves three steps.

Step 1. You need to type the number.
Step 2. You need to check the number for errors.
Step 3. You need to press the ENTER key [row 5, key I].
In order to successfully type numbers in an E.Z. Arithmetic number input screen, you need to be familiar with 12 keys: the ten digit keys, the DECIMAL POINT key and the $+/$ - key.

First, you'll need to know how to type digits. Here are the ten digit
keys and their locations:

|  | [row 8, key 2] |
| :---: | :---: |
| 2 | [row 8, key 3 ] |
| 3 | [row 8, key 4] |
| 4 | [row 7, key 2 ] |
| 5 | [row 7, key 3] |
| 6 | [row 7, key 4] |
| 7 | [row 6, key 2] |
| 8 | [row 6, key 3] |
| 9 | [row 6, key 4] |
| 0 | [row9, key] |

Next, you'll need to know how to type a decimal point. For this, you'll need to use the DECIMAL POINT key [row 9 , key 3]. To type a decimal number, type the digits before the decimal point, press the DECIMAL POINT key and type the digits after the decimal point. This is similar to the way you'd type a decimal on another calculator, on a computer or on a typewriter.

Finally, you'll need to know how to type a negative number. For this, you must use the $+/$ - key [row 5, key 2]. In E.Z. Arithmetic, never, NEVER, use the SUBTRACTION key [row 8, key 5] to type a negative sign. On the HP 48SX, the SUBTRACTION key is supposed to be used for subtracting two numbers, not for typing a negative sign. To type a negative number, just type the number as if it were not a negative number. In other words, just type the digits and the decimal point, if any. Then, press the $+/$ - key to tum the number negative. If you made a number negative by mistake, another press of the + - key will make the number positive. Remember, type your number BEFORE pressing the $+/$ - key and do NOT use the SUBTRACTION key.

Hereafter, we'll use the word character to refer to a digit, a decimal point, a negative sign, or a positive sign. The number -5126.37 has eight characters: the six digits $5,1,2,6,3$ and 7 , the negative sign and the decimal point. In computer lingo, the word character also refers to a letter, a space, a punctuation mark and just about any other single mark or symbol appearing on the display screen.]

## Editing and Deleting Numbers

You've just leamed how to type numbers. But what if you've noticed a mistake in one or more of the digits or in the placement of the decimal point. How do you correct any such error before pressing the ENTER key? And what do you do if you've already pressed the ENTER key?

To successfully edit or delete a number, you need to be familiar with five keys: the ON key, the BACKSPACE key, the LEFT CURSOR key, the

RIGHT CURSOR key and the DEL key.
Press the ON key [row 9 , key I] to delete the entire number you've typed so that you can type a different number. Be careful not to press the ON key a second time because doing so will abort the entire number input process and retum you to the screen from which you started.

Use the BACKSPACE key [row 5, key 5] to delete the last part of the number. Each press of the BACKSPACE key moves the cursor one place to the left, erasing each time it moves the rightmost character of the number, the one that was immediately to the left of the cursor. Press the BACKSPACE key five times to erase the last five characters of the number. If you typed 879.6324, six presses of the BACKSPACE key will erase the 9.6324 and leave 87 displayed on the screen with the cursor immediately to the right of the 7 . Once you've backspaced enough to remove all the unwanted characters, you may then add whatever new characters you desire to the end of your number.

Press the LEFT CURSOR key [row 3, key 4] to move the cursor to the left without erasing any characters it passes over. Each press of the LEFT CURSOR key moves the cursor one place to the left leaving the number you typed intact.

Press the RIGHT CURSOR key [row 3 , key 6 ] to move the cursor to the right without erasing any characters it passes over. Each press of the RIGHT CURSOR key moves the cursor one place to the right leaving the number you typed intact.

Press the DEL key [row 5 , key 4 to delete the character under the cursor. Each press of the DEL key will delete the character under the cursor and cause all the digits that were to the right of the cursor to move one place to the left.

To remove a character from your number, move the LEFT CURSOR and RIGHT CURSOR keys as many times as necessary to place the cursor over the character you want deleted. Then press the DEL key to erase the character under the cursor. You may then use the LEFT CURSOR, RIGHT CURSOR and DEL keys repeatedly to remove any other undesired characters from the number.

To insert a character in your number, use the LEFT CURSOR and RIGHT CURSOR keys to move the cursor to the character just before which you would like to place the new character. Then, type the new character. The number will split open and make a space to accept the newly typed character.

If you suddenly realize that the number you've just typed had an error but you've already pressed the ENTER key, then press the ON key [row 9, key I] to abort the number input process. You'll be taken back to the screen from which you selected your problem and have the opportunity to start over again.

Now that we've leamed the HP 48SX basics necessary to make full of E.Z. Arithmetic, let's turn to Chapter Two to learn how to plug in your E.Z. Arithmetic ROM card and to begin using E.Z. Arithmetic.

Have fun!!

## Chapter Two

## Menu

Screens

## HOW TO START E.Z. ARITHMETIC

This chapter describes how to get your E.Z. Arithmetic ROM card up and running on your HP 48SX and the screens used in E.Z. Arithmetic.

You'll first need to get your E.Z. Arithmetic ROM card inside your HP 48SX. The procedure for installing and removing cards is fully described on pages 635 to 638 in your HP Owner's Manual. Here's a quick summary:

Make sure that your HP 48SX is tumed off before you begin. Holding it screen side up as if you were about to do a few calculations, turn it over so that you are now looking at its back side.

Down at the bottom, just below the tiny panel containing the words "Made in USA" and "Ө Hewlett Packard", there is a small cover under which is the battery compartment. Since we are not about to change the batteries, let's leave this cover alone.

Up at the top, just above the numbers 1 and 2 , is another smaller cover under which are the two HP 48SX ports. This is where you'll put the E.Z. Arithmetic ROM card once you've removed the port cover.

To remove the cover, put your thumb on the five-ridge grooved rectangular area near the bottom of the port cover. While gently applying pressure with your thumb, simultaneously push forward until the port cover slides off.

Inside you'll see two slots or ports. Holding the E.Z. Arithmetic ROM card label side up, carefully insert it into one of the two ports, making sure that the card doesn't end up half in one port and half in the other. When you first feel resistance as you are sliding the card in, you'll know that you've got just one quarter of an inch left to go before your card is properly in place.

Carefully slide the port cover back on so that it is attached as snugly to the HP 48SX as it was originally.

Now turn on your HP 48SX by pressing the ON key [row9, key 1]. When a display appears on the screen, press the ALPHA key [row 6 , key 1 ] twice, then press the A key [row 1, key 1] and finally press the R key [row 3, key 6]. You should now see AR displayed near the lower left comer of the screen. Press the ENTER key [row 5, key I] to see the E.Z. Arithmetic Title Screen. If you look at the top of the Title Screen, just above the "w" in "E.Z. Arithmetic", you'll notice a little figure in the shape of an hourglass. You'll always see this little hourglass figure when the HP 48SX is busy carrying out your last instructions which, in this case, are setting up E.Z. Arithmetic to run smoothly and without problems on your calculator. Finally, in a few seconds, the Title Screen will be replaced by the Main Menu Screen from where you can access all the features of E.Z. Arithmetic. You'll find a full discussion of the Main Menu Screen on the next two pages.

## THE MAIN MENU SCREEN

| MAIN MENU <br> 1. Whole Numbers <br> 2. Fractions <br> 3. Decimals <br> 4. Percents <br> 5. Integers <br> Pick a number <br> STAK KILL | OFF |
| :---: | :---: |

## Getting to the Main Menu Screen

There are two ways to get to the Main Menu Screen:

- Wait a few seconds while viewing the E.Z. Arithmetic Title Screen.
- Press MAIN [row 1, key 5] on any screen whose menu bar has this button.


## The Main Menu Screen Menu Bar

There are three keys active on the Main Menu Screen Menu Bar:
STAK Press this key [row 1, key 3] to temporarily leave E.Z. Arithmetic to use your HP 48SX for other tasks. To return to the E.Z. Arithmetic Main Menu Screen, press the CST key [row 2, key3] and then press the CONT key [row 1, key 1] on the menu bar.
KILL Press this key [row 1, key 4 ] to terminate E.Z. Arithmetic. When you again want to use E.Z. Arithmetic, repeat the start-up sequence described in Chapter 2 which is as follows: Press the ALPHA key [row 6, key I] twice, press A [row 1, key 1] and R [row 3, key 6], press the ENTER key [row 5, key 1] to get to the E.Z. Arithmetic Title Screen which, after a few seconds, will be replaced by the E.Z. Arithmetic Main Menu Screen.
OFF Press this key [row 1, key 6] to turn off your HP 48SX. To turm it back on, press the ON key [row 9, key 1] and you will find yourself back in the E.Z. Arithmetic Main Menu Screen.

## The Main Menu Screen Options

There are five options available on the Main Menu Screen:
1 Whole Numbers. Press this key [row 8, key 2] to go to the Whole Number Menu Screen from which you can learm and drill the methods for adding, subtracting, multiplying and dividing whole numbers and understand the meaning and use of factors, multiples, prime numbers, and composite numbers.
2 Fractions. Press this key [row 8, key 3] to go to the Fraction Menu Screen from which you can understand the meaning and types of fractions, leam and drill the methods for adding, subtracting, multiplying and dividing fractions, learn how to compare the sizes of fractions and master the methods for converting fractions from one form to another.
3 Decimals Press this key [row 8, key 4 to go to the Decimal Menu Screen from which you can understand the meaning of decimals, leam and drill the methods for adding, subtracting, multiplying and dividing decimals, learn how to round off decimals and master the methods for conversions involving fractions and decimals.
4 Percents. Press this key [row 7 , key 2 ] to go to the Percent Menu Screen from which you can understand the meaning of percents, master the methods for conversions involving percents, fractions and decimals and learn how to solve percent problems.
5 Integers. Press this key [row 7 , key 3] to go to the Integer Menu Screen from which you can understand the meaning of integers, grasp basic concepts about integers such as absolute value and opposite and leam and drill the methods for adding, subtracting, multiplying and dividing integers.

## THE OPTION MENU SCREENS

```
FRACTIONS
2. Basic
Conversions
Operations
Drill
Pick a number
INEXT PREV STAK KILL MAIN OFF
```


## Getting to an Option Menu Screen

There are three ways to get to an Option Menu Screen:

- Press any of the Option choices on the Main Menu Screen.
- Press INEXT [row 1, key I] on the previous Option Menu Screen.
- Press PREV [row 1, key 2] on the next Option Menu Screen.


## The Option Menu Screen Menu Bar

There are six keys active on the Option Menu Screen Menu Bar:
NEXT Press this key [row 1, key I] to go to the next Option Menu Screen.
PREV Press this key [row 1, key 2 ] to go to the previous Option Menu Screen.
STAK Press this key [row 1, kej-3] to temporarily leave E.Z. Arithmetic to use your HP 48SX for other tasks. To retum to the same E.Z. Arithmetic Option Menu Screen you left, press the CST key [row 2, key 3] and then press the CONT key [row 1, key I] on the menu bar.
KIIL. Press this key [row 1, key 4 ] to terminate E.Z. Arithmetic. When you again want to use E.Z. Arithmetic, repeat the start-up sequence described in Chapter 2 which is as follows: Press the ALPHA key [row 6, key 1] twice, press A [row 1, key 1] and R [row 3, key 6], press the ENTER key [row 5, key 1] to get to the E.Z. Arithmetic Title Screen which, after a few seconds, will be replaced by the E.Z. Arithmetic Main Menu Screen.

MAIN Press this key [row 1, key 5] to go to the Main Menu Screen.
OFF Press this key [row 1, key] to tum off your HP 48SX. To tum it back on, press the ON key [row9, key 1] and you will find yourself back in the same E.Z. Arithmetic Option Menu Screen.

## THE SUB-OPTION MENU SCREENS

```
FRACTION CONVERSIONS
1. Improper fractions
        and whole or mixed
        numbers
2. Changing the terms
        of a fraction
    Pick a number
NEXT PREV STAK EXIT MAIN OFF
```


## Getting to an Sub-Option Menu Screen

There are three ways to get to an Sub-Option Menu Screen:

- Press any of the Option choices on an Option Menu Screen.
- Press NEXT [row 1, key 1] on the previous Sub-Option Menu Screen.
- Press PREV [row 1, key2] on the next Sub-Option Menu Screen.


## The Sub-Option Mena Screen Menu Bar

There are six keys active on the Sub-Option Menu Screen Menu Bar:
[NEXT Press this key [row 1, key I] to go to the next Option Menu Screen.
PREV Press this key [row 1, key 2] to go to the previous Option Menu Screen.
STAK Press this key [row 1, kes 3] to temporarily leave E.Z. Arithmetic to use your HP 48SX for other tasks. To return to the same E.Z. Arithmetic Sub-Option Menu Screen you left, press the CST key [row 2, key 3] and then press the CONT key [row 1, key I] on the menu bar.
EXIT Press this key [row 1, key 4] to leave this screen and retum to the Option or Sub-Option Screen from which you came.
MAIN Press this key [row 1, key 5] to go to the Main Menu Screen.
OFF Press this key [row 1, key 6] to turn off your HP 48SX. To turn it back on, press the ON key [row 9, key 1] and you will find yourself back in the same E.Z. Arithmetic Sub-Option Menu Screen.

## THE METHOD MENU SCREENS

## WHOLE NUMBER READING 1

NOTE. WHEN COMMAS ARE USED TO WRITE A WHOLE NUMBER, THE THREEDIGIT GROUPS, STARTING FROM THE NEXT-TO-LAST GROUP AND GOING TO THE LEFT HAVE THESE NAMES: THOUSAND, MILLION, BILLION, TRILLION, QUADRILLION, QUINTILLION,
MORE MOUL EXIT MAIN OFF

## Getting to a Method Menu Screen

There are three ways to get to a Method Menu Screen:

- Press any of the Option choices on a Sub-Option Menu Screen.
- Press MORE [row 1, key I] on the previous Method Menu Screen.
- Press the ALPHA key [row 6, key 1], then MORF. [row 1, key2] on the next Method Menu Screen.


## The Method Menu Screen Mena Bar

There are up to five keys active on the Method Menu Screen Menu Bar:
MOREE Press this key [row 1, key 1], if present, to go to the next Method Menu Screen. From the last Method Menu Screen, another press will take you to the first Method Menu Screen. If you press the ALPHA key before pressing this key, you'll go to the previous Method Menu Screen. From the first Method Menu Screen, another press of the ALPHA key and this key will take you to last Method Menu Screen.
MODL Press this key [row 1, key 2 ] to go to the Model Problem Menu Screen corresponding to this Method Menu Screen. If you have already seen Model Problem Screens corresponding to this Method Menu Screen, pressing this key will take you back to the last Model Problem Screen you saw; otherwise, you'll be taken to the first Model Problem Screen.
EXIT Press this key [row 1, key 4] to leave this screen and return to the Option or Sub-Option Screen from which you came.
MAIN Press this key [row 1, key 5 ] to go to the Main Menu Screen.
OFF Press this key [row 1, key'6] to tum off your HP 48SX. To tum it back on, press the ON key [row 9, key !] and you will find yourself back in the same E.Z. Arithmetic Method Menu Screen.

## THE MODEL PROBLEM MENU SCREENS

```
WHOLE NUMBER READING EXAMPLES 1
1) READ 392
ANS:THREE HUNDRED NINETY TWO
2) READ 48,105
ANS: FORTY EIGHT THOUSANS,
ONE HUNDRED TWO
3) READ 2,546,009
ANS:TWO MILLION, FIVE HUNDRED
    FORTY SIX THOUSAND, NINE
METH MORE EXIT MAIN OFF
```


## Getting to a Model Problem Menu Screen

There are three ways to get to a Model Problem Menu Screen:

- Press MOOL [row 1, key 2] on a Method Menu Screen
- Press MOAE [row 1, key I] on the previous Model Problem Menu Screen.
- Press the ALPHA key [row 6, key 1], then MOHE [row 1, key 2] on the next Model Problem Menu Screen.


## The Model Problem Menu Screen Menu Bar

There are up to five keys active on the Model Problem Menu Screen Menu Bar:
[METH Press this key [row 1, key 1] to go to the Method Menu Screen from which you came.
MORE Press this key [row 1, key 2], if present, to go to the next Model Problem Menu Screen. From the last Model Problem Menu Screen, another press will take you to the first Model Problem Menu Screen. If you press the ALPHA key before pressing this key, you'll go to the previous Model Problem Menu Screen. From the first Model Problem Menu Screen, another press of the ALPHA key and this key will take you to last Model Problem Menu Screen.
EXIT Press this key [row 1, key 4] to leave this screen and return to the Sub-Option Screen from which you came to the Method Menu Screen corresponding to this Model Problem Menu Screen.
MAIN Press this key [row 1, key'5] to go to the Main Menu Screen.
OFF Press this key [row 1, key 0 ] to turn off your HP 48SX. To tum it back on, press the ON key [row 9, key 1] and you will find yourself back in the same E.Z. Arithmetic Model Problem Menu Screen.

## THE DRILL SELECTION MENU SCREENS



## Getting to a Drill Selection Menu Screen

There are two ways to get to a Drill Selection Menu Screen:

- Choose any option on a Drill Sub-Option Menu Screen.
- Press NO [row 1, key2] on a Drill Redo Menu Screen.


## The Drill Selection Menu Screen Menu Bar

There are three keys active on the Drill Selection Menu Screen Menu Bar:

## EXIT Press this key [row 1, key 4 to leave this screen and return to the Drill

 Sub-Option Menu Screen from which you picked the operation to drill.MAIN Press this key [row 1, key 5] to go to the Main Menu Screen.
OFF Press this key [row 1, key] to turn off your HP 48SX. To tum it back on, press the ON key [row 9, key 1] and you will find yourself back in the same E.Z. Arithmetic Drill Selection Menu Screen.

## THE DRILL REDO MENU SCREENS



## Getting to the Drill Redo Menu Screen

There are two ways to get to the Drill Redo Menu Screen:

- After you have finished making all the choices about the group of problems you wish to drill.
- From the Drill Report Menu Screen which appears after you have finished doing a group of drill problems.


## The Drill Redo Menu Screen Menu Bar

There are five keys active on the Drill Redo Menu Screen Menu Bar:
YES Press this key [row 1, key 1] to approve all your selections and begin working your way through a group of drill problems.
NO Press this key [row 1, key 2] to go to a Drill Selection Menu Screen from where you can tell which selections you would like to change.
EXIT Press this key [row 1, key4] to leave this screen and return to the Drill Sub-Option Menu Screen from which you picked the operation to drill.
MAIN Press this key [row 1, key 5] to go to the Main Menu Screen.
OFF Press this key [row 1, key 0] to turn off your HP 48SX. To tum it back on, press the ON key [row 9, key 1] and you will find yourself back in the same E.Z. Arithmetic Drill Redo Menu Screen.

## THE DRILL REPORT MENU SCREENS



## Getting to an Drill Report Menu Screen

There are three ways to get to a Drill Report Menu Screen:

- Get a drill problem correct within three attempts.
- Get a drill problem urong three times in a row.
- Finish a group of drill problems.


## The Drill Report Mena Screen Mena Bar

There are four keys active on the Drill Report Menu Screen Menu Bar:
MORE Press this key [row 1, key I] to leave this screen and do another drill problem.
EXIT Press this key [row 1, key 4 to leave this screen and returm to the Drill Sub-Option Menu Screen from which you picked the operation to drill.
MAIN Press this key [row 1, key 5 ] to go to the Main Menu Screen.
OFF Press this key [row 1, key 0] to turn off your HP 48SX. To tum it back on, press the ON key [row 9, key 1] and you will find yourself back in the same E.Z. Arithmetic Drill Report Menu Screen.

## THE E.Z. ARITHMETIC DRILL FEATURE

The E.Z. Arithmetic Drill Feature is very easy to use. Here is the procedure to follow.

Start by selecting the set of numbers you wish to drill from the Main Menu. You can choose whole numbers, fractions, decimals or integers. Then, from the Option Menu Screen for that set of numbers, select the "Drill" option. You will then be taken to three Drill Selection Menu Screens from which you can make your selections regarding the drill.

The first Drill Selection Menu Screen allows you to pick the operation you wish to practice. Your choices are addition, subtraction, multiplication and division. In the case of the whole numbers, you may also choose to practice a particular times table.

The second Drill Selection Menu Screen allows you to select the number of problems you want in the set of drill problems. Your choices can be anywhere from one to ten problems to practice.

The third Drill Selection Menu Screen allows you to select the difficulty level of the drill problems. If you are drilling fractions, your choices are level 1 (easy) to level 10 (difficult). If you are drilling whole numbers, decimals or integers, your choices are from 1 to 5 digits in the first number and from 1 to 5 digits in the second number. If you are drilling the times tables, your choices are from the 1 times table to the 10 times table.

After you have made these selections, you will be taken to the Drill Redo Menu Screen which gives you a report of what choices you have made. If you have made a mistake or changed your mind with regard to any of the choices, you will be taken to a Drill Selection Menu Screen from which you can tell E.Z. Arithmetic which selection you would like to change and then go to the appropriate Drill Selection Menu Screen to change your selection.

If you are satisfied with your choices, you will be taken to a Number Input Screen where you will be given your first drill problem. Type in your answer and press the ENTER key. If your answer is wrong, you will be given two more chances to answer the drill problem. If your answer is correct on the first attempt, you will get full credit. If your answer is comect either on the second or third attempt, you will get half or quarter credit.

When you have gotten the correct answer or could not get the correct answer within three guesses, you will be taken to a Drill Report Menu Screen which will tell you how you did with that problem and give you the correct answer.

When you have finished all the problems in your group, you will be taken to another Drill Report Menu Screen which will tell you how you did with the problems in that group. From that screen, you may begin another group of drill problems or go on to do something else.

# Chapter Three 

Course
Outline

## I. The Set of Whole Numbers

A. Basics of Whole Numbers

1. Notation of Whole Numbers
a. Places and place value of whole numbers
b. Writing whole numbers
c. Reading whole numbers
2. Factors of Whole Nambers
a. Meaning of factors
b. Meaning of common factors
c. Meaning of greatest common factor [GCF]
d. Meaning of factorization and prime factorization
3. Maltiples of Wbole Numbers
a. Meaning of multiples
b. Meaning of common multiple
c. Meaning of least common multiple [LCM]
4. Types of Wbole Numbers
a. Prime numbers
b. Composite numbers
c. Odd numbers
d. Even numbers
B. Operations on Whole Numbers
5. Addition of Wbole Numbers
6. Subtraction of Whole Nambers
7. Maltiplication of Whole Numbers
8. Division of Whole Numbers
C. Drill of Whole Number Operations
9. Whole Number Addition Drill
10. Wbole Namber Sabtraction Drill
11. Whole Namber Maltiplication Drill
12. Whole Number Division Drill
13. Whole Number Times Tables Drill

## II. The Set of Fractions

## A. Basics of Fractions

1. The Meaping of a Fraction
2. Ordering of Fractions
B. Types of Firactions
3. Proper Fractions
4. Improper Fractions
5. Mixed Numbers
C. Conversions Involving Fractions
6. Conversions Involving ImproperFractions and Whole or Mixed Numbers
a. Converting an improper fraction to a whole ormixed numberb. Converting a whole or mixed number to animproper fraction
7. Conversions Involving Cbanging theTerms of a Fraction
a. Raising a fraction to higher termsb. Reducing a fraction to lower terms
D. Operations on Fractions1. Addition and Subtraction of Fractions
8. Multiplication and Division of Fractions
E. Fraction Operation Drill1. Fraction Addition Drill2. Fraction Subtraction Drill3. Fraction Multiplication Drill4. Fraction Division Drill
III. The Set of Decimals
A. Basics of Decimals
9. The Meaping of a Decimal2. Decimal Places and Place Value3. Rounding Decimals
B. Conversions Involving Decimals
10. Decimal Conversion Facts
11. Converting Decimals to Fractions
12. Converting Fractions to Decimals
C. Operations on Decimals
13. Addition and Subtraction of Decimals
14. Maltiplication of Decimals
15. Division of Decimals
D. Decimal Operation Drill
16. Decimal Addition Drill
17. Decimal Subtraction Drill
18. Decimal Maltiplication Drill
19. Decimal Division Drill

## IV. The Set of Percents

A. Basics of Percents
B. Conversions Involving Percents

1. Converting from a Percent
a. Converting from a percent to a fraction
b. Converting from a percent to a decimal
2. Converting to a Percent
a. Converting from a number to a percent
C. Problems Involving Percents
3. Basics of Percent Problems
4. Finding the Part
5. Finding the Whole
6. Finding the Percent

## V. The Set of Integers

A. Basics of Integers

1. The Meaping of ap Ipteger
2. Facts about Iptegers
3. The Absolute Value of an Integer
4. Ordering of Integers
5. The Opposite of an Integer
B. Operation on Integers
6. Addition of Integers
7. Subtraction of Integers
8. Multiplication of Integers
9. Division of Integers
C. Integer Operation Drill
10. Integer Addition Drill

# 2. Integer Subtraction Drill <br> 3. Integer Multiplication Drill <br> 4. Integer Division Drill 

## 

## What Does E.Z. Algebra Do?

E.Z Algebra for the HP 485X is a comprehensive basic algebra course designed to make it easy for high school and college students, as well as those who need a remedial or refresher course, to build a solid algebra foundation. E.Z. Algebra is organized around these five topics:

Sess E.Z. Algebra makes it easy to understand the meaning and types of sets, to leam the operations and relations used in working with sets and to comprehend the meaning of variables, operations and relations on sets of objects.
Setr of Numbers E.Z. Algebra makes it easy to understand the meaning, purpose and properties of the sets of natural numbers, whole numbers, integers, rational numbers and real numbers.
Operations oa Setsof Numberz E.Z. Algebra makes it easy to understand the meaning of an operation on a set of numbers and to learn the meaning, terminology and properties of the operations of addition, subtraction, multiplication, division, power and root on 2 set of numbers.
Open Phrame E.Z. Algebra makes it easy to understand the meaning, terminology and types of open phrases (algebraic expressions) and of numerical phrases (numerical expressions) and to leam how to evaluate open and numerical phrases, how to translate English phrases into open phrases, how to add, suburact, multiply and divide open phrases, how to simplify open phrases by factoring and how to simplify open phrases which contain grouping symbols, fractions or radicals.
Open Sentences E.Z. Algebra makes it easy to understand the meaning of open and numerical sentences, the meaning of solution and solution set of an open sentence, and the meaning of solving and graphing an open sentence, to learn the types of open sentences, and to master the methods for solving and graphing open sentences.

## What's Special About E.Z. Algebra?

E.Z Algebra has many special and unique features which contribute to its practicality, ease of use and enhancement of mathematical education. Here are some of them:

- A very easy-to-use, logically organized, user-friendly interface enables those who consider themselves to be calculator or computer inliterates, as well as those who don't like to read manuals, to have access to all program features quickly and easily.
- Since the HP 48SX weighs a mere 8 ounces, people find te very easy to take B.Z. Algebra along with them to study, practice, drill and master math in a study hall, travelling on a train or bus, riding in a car, waiting on line, away on vacation, during a work break-in short, E.Z. Algebra makes self study in algebra at any almost time and in almost any place easy and pleasant. This makes owning E.Z. Algebra almost like having a personal private tutor on call 24 hours a day-at a fraction of the cost.
- Our easy-off feature allows turning off the HP 48SX at any point and later tuming it back on to continue on right from where you left off.
- All information, method, definition, concept, menu, graphics and example screens are easily printable on the HP82240 infrared printer.
- Careful error trapping takes care of invalid user input without crashing the program.
- Absolutely no user contact with the stack is required to make use of all B.Z. Algebra features. Yet, going to the stack without quitting B.Z. Algebra is just a keystroke away.
- Our easy-quit feature restores all user system flags and custom menus, leaves no "garbage" on the stack and gets rid of variables which are no longer needed when quitting E.Z. Algebra.


## What Does E.Z. Math Do?

E.Z Math has six modules dealing with graphs, loans, savings, number games and music:

Opaphs EZ. Math covers the entire high school and college graphing curriculum, from elementar' algebra to advanced calculus. The studeat can choose from 188 families of equations, inequalities, fuoctions, yytems of equations and nytems of inequalidies, in rectungular, polar and parametric form, all hid out and arranged in an easj-10-ase, logically
 trigooometric, huperbolic, logarithmic and expooential fudctions quick and easj.
Loans E.Z. Math makes it easy' to solve problems involving fired rate mortgages oo houses, condos, co-ope, and other real estute investmenta Anjoos wanting to parchase a home can quickly' compute the moathly morigage pasment the amount that can be borrowed, the oumber of years peeded to pay off the loan aod the anoual interest rate and see a demiled breakdorno of each pasment in a complete amortizition tuble.
Saviaga E.Z. Math makes th easy to solve problems involving a single deposit or reperved deposits to a savings mocount, certificate of deposit [C.D.]. term deposit [TD.], mooes market socouat or other such investment. Anyope interested in saving mooes can quictly and easily compute the amount accumulated, the amount that must be depocited, the cumber of jears decessary' to keep the mooes; on deposit and the anoun interesa rite.
Numbers E.Z. Math makes it easy to handle sumbers of various inpes. Elementary and high school stodeats will fiod it eag' to compute all the factors add the prime fictorizution of 2 altural gumber. In addition, finding the greatert commoo fretor, least commoo multiple and average of any set of oanural numbers is a soap. Aoy sei of ratiooal oumbera, whether in Thole aumber, frection or mixed aumber form, may be added, gubrreted, multiplied or divided sielding an answer expressed as a frection or mixed cumber in lowest terms or as an integer. Anj; set of complex numbers maj be added, subracted, multiplied, divided or nised to a power. Any number of terms of the sequences of perfect ath powers, trinaquar cumbers, binomill coeftrients, Fibonscci numbers and malliples of a aumber can be easiby computed.
Recreation E.2. Math provides 2 couple of strategy aumber games and an introduction to the musical capmbilities of the HP 48SX. These are provided both for fun and as an encouragement to explore further some of the many features of the calenlator, iochoding a bit of the built-in rich programming language.
Education. Although using most features of E.Z. Math involves no more than plugging in the ROM card and following the varous 00 -screen menus, the E.Z. Math User's Manoal explains ver' clearl; and precisely; io complete detail all features and display screens of the program. Just as important, 46 pages of the manual are devoled to simple, intritive explanations of the basic concepts involved in graphs, oumbers, sets, variables, equations, savings and loans.

## What's Special About E.Z. Math?

E.Z. Math has many special and unique features which contribute to $i$. practicality and ease of use. Here are some of them:

[^0]
## What Does E.Z. Arithmetic Do?

E.Z. Arithmetic for the HP 48 SX is a comprehensive basic arithmetic course designed to reinforce basic computational skills and make solving all kinds of arithmetic problems a snap! E.Z. Arithmetic helps you master:

Whole Numbers. E.Z. Arithmetic makes it easy to learn how to add, subtract, multiply and divide whole numbers and to understand the meaning and use of factors, multiples, prime numbers, and composite numbers.
Fractions. E.Z. Arithmetic makes it easy to understand the meaning and types of fractions, to learn how to add, subtract, multiply, divide and compare the sizes of fractions and to master the methods for converting fractions from one form to another.
Decimals. E.Z. Arithmetic makes it easy to understand the meaning of decimals, to learn how to add, subtract, multiply, divide and round off decimals and to master the methods for conversions involving fractions and decimals.
Percents. E.Z. Arithmetic makes it easy to understand the meaning of percents, to master the methods for conversions involving percents, fractions and decimals and to learn how to solve percent problems.
Integers. E.Z. Arithmetic makes it easy to understand the meaning of integers, to grasp basic concepts about integers such as absolute value and opposite and to learn how to add, subtract, multiply, divide and order integers.
Computational Skills. E.Z. Arithmetic makes it easy to practice and master computational skills by providing endlessly varied, randomly selected sets of problems involving whole number, fraction, decimal and integer operations. At all times, the user may pick the operation and number type to drill and choose the number of problems in and difficulty level for each problem set. As the user works through each set of problems, E.Z. Arithmetic provides reinforcement by keeping score, by redisplaying each problem when showing the correct answer and by displaying the final statistics for the problem set after the last problem is done.

## What's Special About E.Z. Arithmetic?

E.Z. Arithmetic has many special and unique features which contribute to their practicality, ease of use and enhancement of mathematical education. Here are some of them:

- A very easy-to-use, logically organized, user-friendly interface enables those who consider themselves to be calculator or computer illiterates, as well as those who don't like to read manuals, to have access to all program features quickly and easily.
- Since the HP 48SX weighs a mere 8 ounces, people find it easy to take E.Z. Arithmetic along with them to study, practice, drill and master arithmetic in a study hall, travelling on a train or bus, riding in a car, waiting on line, away on vacation, during a work break-in short, E.Z. Arithmetic makes self study in arithmetic at almost any time and in almost any place easy and pleasant. This means that owning E.Z. Arithmetic is almost like having a private tutor on call 24 hours a day-at a fraction of the cost.
- Our easy-off feature allows turning off the HP 48SX at any point and later turning it back on to continue on right from where you left off.
- All information, method, definition, concept, menu, graphics and example screens are easily printable on the HP82240 infrared printer.
- Careful error trapping takes care of invalid user input without crashing the program.
- Absolutely no user contact with the stack is required to make use of all E.Z. Arithmetic features. Yet, going to the stack without quitting E.Z. Arithmetic is just a keystroke away.
- Our easy-quit feature restores all user system flags and custom menus, leaves no "garbage" on the stack and gets rid of variables which are no longer needed when quitting E.Z. Arithmetic.


[^0]:    - A verj easj-to-use, logically organized user interface makes possible the foll use of ill EZ. Math fearures without having to open the 850 page HP Owoer's Manual.
    - To reduce the possibilify or user error, all answer screens repeat all eatered dath when displaying the answer.
    - All menu screens, answer screens and graphices screens are easily prinuble oo the HP82240 infrared printer.
    - Careful error trapping takes care of invalid user input without crashing the program.
    - Absolutely no user contact with the stact is required to we all EZ. Math fertures. Yet, going to the stack without quitting E.Z. Math is just a kesztroke awa):
    - Our eary quit feature restores all user syztem dags and curtom meaus, leaves do "garbage" on the stack and gets rid of variables which are no longer needed.
    - Our eass off fearure alloriz turning off the calculator without quitting the prognm.

