Chapter 2

Basic operation

Contents

Introduction

This chapter explains how to quickly get started using your HP 49G. You will learn how to adjust the calculator's display and how to set various modes that determine how the calculator behaves.

Various ways of entering data are covered. You are also introduced—with the help of a number of examples—to entering calculations.

The HP 49G has a useful alarm function. You use this function to set yourself reminders and to run programs at set times.

Turning on and turning off

Turning on

To turn on the HP 49G, press ON.

When you first turn on the calculator, a "Try to Recover Memory?" message is displayed. You should respond by pressing NO.

If the calculator does not turn on when you press ON, the batteries may need replacing. See appendix D, "Troubleshooting", for instructions on replacing the batteries.

If the message "Invalid Card Data" is displayed each time you turn the calculator on, you need to initialize the calculator's ports. See page D-6 for instructions.

When you turn on the calculator, the screen redisplays the data that was displayed when you last turned the calculator off.

The HP 49G has an automatic power-saving switch. This switch is activated when there has been no calculator activity for 5 minutes. When this occurs, the screen will go blank. You can restore the display—and its contents—by pressing ON.

When the calculator is already on, pressing ON is equivalent to pressing CANCEL.

Changing the screen contrast

To change the display contrast (thereby darkening or lightening the text relative to the background):

1. press and hold ON
2. press + to darken text or − to lighten text
3. release ON when the contrast is satisfactory.

Turning off

To turn off the calculator, press ↱ OFF.

You do not have to save your history before turning off the calculator. (History is explained on page 2-6.) When you next turn the calculator on, your history will be redisplayed.

Default screen

The screen that appears when you turn on the calculator is called the default screen.

Figure 2-1: The default screen

Many of your calculator operations can be done from the default screen. However, when you open various applications—such as Equation Writer, Matrix Writer, and so on—the display will change to provide you with tools for working with that application.

There are three main components of the default screen:

- status area
- history
- menu.

In addition to the status history, and menu, the bottom line of the display becomes the command line when you start to enter data. The command line—or user input line—is discussed on page 2-7.

Status area

The status area displays annunciators, the current directory path, and messages. It also displays various alerts.

Annunciators indicate the settings you have selected, certain keys you have pressed, and the status of the calculator. The full set of annunciators is given in table 2.1.

By default, the status area takes up two lines. You can reduce this to one line, or choose not to display the status area. You might do this to see more of your history area. See “Display modes” on page 2-19 for information on changing the size of the status area.

Symbol	Meaning
◀	You have pressed ◀.
▶	You have pressed ▶.
α	The alpha keyboard is active: you have pressed ALPHA.
((•))	This indicates an alert. For example, an appointment has become due, or battery power is low. A message on the line below the annunciator explains the alert.
⧖	The calculator is busy.
⇢	Data is being transmitted to an external device.
DEG	The angle unit is set to degrees.
RAD	The angle unit is set to radians.
GRD	The angle unit is set to gradians.
XYZ	The coordinates notation is rectangular.
R∠Z	The coordinates notation is polar or cylindrical.
R∠∠	The coordinates notation is polar or spherical.
HLT	A program has been halted or an application suspended.
1US	The user keyboard is active for one operation.
USR	The user keyboard is active until you press ◀ USER.
ALG	Algebraic mode is active.
PRG	Program mode is active.
≈	Results are displayed in approximate mode.

Symbol	Meaning (Continued)
=	Results are displayed in exact mode.
R	Real number mode.
C	Complex number mode.
X (or Y...)	The current independent variable.
DEC	Decimal base.
BIN	Binary base.
HEX	Hexadecimal base.
OCT	Octal base.

Table 2-1: Annunciators

History

All the objects you create with the HP 49G—equations, calculations, graphics, plots, programs, variables, and so on—are displayed in the history area of the screen. (See figure 2.1 on page 2-3.) Press ▲ or ▼ to scroll through the history. You can also select a previous object to use again or to incorporate into a new object on the command line.

To insert an object from history onto the command line, place the cursor where you want the object inserted and:

1. Press HIST.
2. Press ▼ or ▲ until the object you want to select is highlighted.
3. Press ENTER.

You can see more of your history by reducing the size of the status area or reducing the system font size. (See "Display modes" on page 2-19.)

Your objects remain in history until you delete them. They are automatically saved when you turn off the calculator. You can clear your history by pressing → CLEAR.

Menu

A menu is displayed across the bottom of most screens. Each item on the menu is one of the following:

- a command
- the name of another menu
- a variable
- a subdirectory.

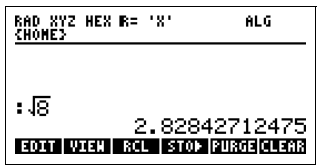
The menu changes according to the key, command, or sub-menu you select. For example, if you press (VAR), the menu displays the variables and directories you can access from your current path. (Variables are the named objects that you have created and saved, and subdirectories are areas of memory you have set aside and named, usually to help you better manage the storage of saved objects. Variables and directories are explained in detail in chapter 7, "Storing objects".)

When you press certain other keys, the menu changes to show commands or other menus. When chosen, a command enables you to perform some operation on data, such as a mathematical operation, a storage operation, a unit conversion operation, and so on).

Many of the more commonly used commands have a key of their own. For example, you can store an object by pressing (STO▶), or find the sine of an angle by pressing (SIN). Other commands need to be selected from menus.

Selecting a menu item

A menu item that is displayed at the bottom of the screen can be selected by pressing the function key—that is, one of the keys labelled (F1) to (F6)—directly below the item. In the example on the right, to select EDIT from the menu, you would press (F1), since (F1) is directly below EDIT.



While function key menus are widely available, most HP 49G commands are more easily accessible from choose list menus. This type of menu—in the form of a scrolling list—displays similar groups of commands (such as calculus commands, trigonometry commands, and so on). To see an example of such a menu, press (↱)(ALG).

Most menus can be displayed as a function key menu *and* as a choose list menu. Where this is the case, the default is to display the menu as a choose list. If you prefer all menus to be displayed as function key menus, clear flag –117.

Multi-screen menus

There may be more function-key menu items than can be displayed on the one screen. In this case, press NXT—or ↰ PREV—to display further pages of the menu.

Where there are more items on a choose list menu than can be displayed on the one screen, press ▼ or ▲ to display further items. You can also jump directly to a choose list menu item by entering the first character of the item (or, in the case of numbered menus, the number of the item).

Using the command line

The command line is the area of the display where you can enter and edit objects. It is always at the bottom of the display, immediately above the menu. (See figure 2.1 on page 2-3.)

You do not have to first select the command line before entering a new object. As soon as you start entering text—numbers or characters—the command line becomes active. For example, to multiply 5 by 6, enter 5 and note that the digit appears on the bottom line of your display. This is the command line. A flashing arrow to the right of the 5 indicates that you are in data entry mode. You then enter the rest of the object (by pressing × and 6 in the example).

When you have finished entering your object, press ENTER. If you entered a calculation, the result of your calculation is displayed on the screen, on the line below the calculation. Your calculation is retained so that you can see how you derived the answer. (See page 2-21 for an example.)

You cancel a command line entry by pressing CANCEL. You will be asked to confirm your intention if your entry exceeds the width of the screen.

Multi-line entries

The information you enter on the command line can occupy more than one line, for example, when you are entering a program. (See chapter 10, “Introduction to programming”, for information on entering programs.) To create a new line, press ↵ ↵. What you have already typed moves up and a new line becomes available for you to continue entering your object.

You can set a display mode so that each new line is automatically indented. See “Display modes” on page 2-19 for information.

Entering numbers

Positive numbers

You enter a positive number by pressing the appropriate digit keys and, if necessary, the decimal point key (.).

Negative numbers

To enter a negative number, type the number as if it was a positive number and then press +/-. The +/- key changes the sign of the number on the command line: from positive to negative, or negative to positive.

Integers and real numbers

If you are working in exact mode—explained on page 2-23—the answer given to a calculation will depend on the way you represent integers. If you represent an integer as a real number—by entering a decimal point after the number—the HP 49G assumes that you want to switch to approximate mode (see page 2-23). Therefore, you can obtain an approximate answer in exact mode by entering integers as real numbers.

(A) (B)

Figure 2-2: In case (A) 2 is entered as an integer; in case (B), 2 is entered as a real number.

Mantissa-and-exponent entry

1. Enter the mantissa (and, if necessary, press (+/-) to change its sign).
2. Press (EEX). An "E" is displayed to indicate that the exponent follows.
3. Enter the exponent (and, if necessary, press (+/-) to change its sign).
4. Press (ENTER).

A number entered as a mantissa and exponent will only be displayed as a mantissa and exponent if the number display mode is set to scientific or engineering. See the next section for information on number display modes.

Number displays

Real numbers can be displayed in one of four modes:

- **Standard mode** displays numbers using full precision. All significant digits to the right of the decimal point are shown, to a maximum of 12 digits.
- **Fix mode** displays numbers rounded to a user-specified number of decimal places. A separator (comma or period) separates groups of three digits in real numbers greater than 999.
- **Scientific mode** displays a number as a mantissa—with one digit to the left of the decimal point and a user-specified number of decimal places—and an exponent. For example, 1234 appears as 1.23400E3 in scientific mode with 5 decimal places.
- **Engineering mode** displays a number as a mantissa with a user-specified number of decimal places, followed by an exponent that is a multiple of 3. For example, 87654 appears as 87.6540E3 in engineering mode with 4 decimal places.

The number display defaults to standard mode. You can change the display by pressing (MODE). This is explained in detail on page 2-18.

For fix, scientific, and engineering modes, the maximum number of decimal places you can specify is 11.

Entering characters

The HP 49G's alpha keyboard enables you to enter letters and other characters. The (ALPHA) key is used, in various ways, to activate the alpha keyboard.

When the alpha keyboard is active, many of the keys become character keys. These are the keys that have a white letter printed on a green background in the bottom right corner.

The alpha annunciator—α—appears in the status area whenever the alpha keyboard is active.

Entering a single upper-case character

To enter a single upper-case character, press (ALPHA) and then the appropriate character key. (The alpha keyboard is deactivated after you press a character key.)

Entering several upper-case characters

There are two ways to enter several upper-case characters one after the other:

- press (ALPHA) twice, enter the characters, and press (ALPHA) again, or
- hold (ALPHA) down, enter the characters and release (ALPHA).

Pressing (ALPHA) twice locks the alpha keyboard, keeping it active until you deactivate it (by pressing (ALPHA) again, or by pressing (ENTER) or (CANCEL)).

Entering a single lower-case character

To enter a single lower-case character, press (ALPHA) (↶) and the appropriate character key.

Entering several lower-case characters

To enter several lower-case characters one after the other:

1. If it is not locked already, lock the alpha keyboard (by pressing ALPHA twice).
2. Press ↰ ALPHA. The lower-case keyboard is now locked. Every character key you press now returns the character in lower case.
3. Enter the characters.

If you need to enter an upper-case character while the lower-case keyboard is locked, press ↰ before pressing the character key.

Unlocking the lower-case keyboard

Unlock the lower-case keyboard by pressing ↰ ALPHA. The alpha keyboard remains active, therefore any characters you now enter will be upper-case characters.

Press ALPHA to unlock the alpha keyboard and ENTER when you have finished your entry.

You can also unlock the lower-case keyboard—and the alpha keyboard—by pressing ENTER or CANCEL.

Entering special characters

From the keyboard

When the alpha keyboard is locked, you can enter certain special characters by pressing keys in combination with ↱. For example, letters of the Greek alphabet can be entered by pressing ↱ and a character key. Certain symbols—such as monetary units, arrows, @, and others—can also be entered by first pressing the ↱ key. These characters and symbols are shown above and to the right of the keys on the front cover of the HP 49G pocket guide.

When the alpha keyboard is locked, pressing ↰ and a character key produces a lower-case character (see above). If a numeric key is pressed instead, certain symbols are displayed. These characters and symbols are shown above and to the left of the keys on the front cover of the HP 49G pocket guide.

Using the Characters tool

Most of the common characters you will need can be entered from the keyboard in the ways described earlier in this chapter. You can also enter these characters—and many more—using the Characters tool.

1. Press ↱ (CHARS) to open the Characters tool.

   The Characters tool displays all 256 characters that can be displayed on the HP 49G.
2. If the character you want to select is not displayed, press ▼ until it is displayed.

   The ▼ key displays the next line of characters, or the first line of characters if you have reached the end of the characters display.
3. When the character you want to select is displayed, press the arrow keys until the character is highlighted.
4. If you want to copy just the highlighted character to the command line, press ECHO1. The Characters tool closes and the character you selected is copied to the command line.
5. If you want to copy the highlighted character and other characters, press ECHO. This copies the character you selected to the command line, and the Characters tool remains open so that you can select other characters. Repeat from step 2 to select other characters.
6. To close the Characters tool, press (ENTER) or (CANCEL).

If the character highlighted in the Characters tool can be entered from the keyboard, the key or combination of keys required is displayed near the bottom left of the screen.

Entering from history

You can also enter an item onto the command line from history.

1. Press (HIST) to display the history list.
2. Press ▲ or ▼ until the item you want to copy to the command line is highlighted.
3. Press (ENTER).

Editing the command line

Table 2.2 lists the command line operations available for moving through the command line, editing the text you have entered, and copying, moving and pasting text.

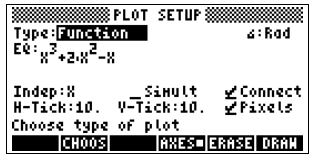
Key(s)	Description
◀ ▶	Move the cursor left or right.
↰ ◀|| ↰ ||▶	Move the cursor to the first or last character shown on the screen.
↱ |◀ ↱ ▶|	Move the cursor to the first or last character of the command line.
▲ ▼	If the command line has more than one line, move the cursor up or down a line.
↰ ▲≡ ↰ ≡▼	If the command line has more than one line, move the cursor to the first or last line shown on the screen.
↱ ▲▔ ↱ ▁▼	Move the cursor to the beginning or end of the command line.
◀	Delete the character to the left of the cursor.
↰ DEL	Delete the character beneath the cursor.
↱ BEGIN	Indicate the start of a selection of text that you want to copy or cut.
↱ END	Indicate the end of a selection of text that you want to copy or cut.
↱ COPY	Copy your selection.
↱ CUT	Cut your selection.
↱ PASTE	Paste, at the position of the cursor, the text you have copied or cut.
CANCEL	Discard the contents of the command line and return to the default screen.
TOOL F1 TOOL F2	Skip to the start or end of the current word.
TOOL F3 TOOL F4	Delete the characters to the start or end of the current word. If preceded by ↱, deletes all characters to the start of, or end of, the command line.

Table 2-2: Command line editing tools

Input forms

Many of the HP 49G's applications have input forms to help you remember the information you need to enter and to set various options.

An input form is just like a dialog box on a computer. The example on the right—displayed when you press ↰ (2D/3D)—is the input form you use to set up a plot.



You need to highlight a field—by moving the cursor to it—before you can enter or change data in it. You move the cursor to a field by pressing the arrow keys.

Input form fields

Each input form has a set of fields, a short help message relating to the currently highlighted field, and a menu that displays choices relevant to the currently highlighted field.

Four types of fields can appear on an input form: data fields, extended data fields, list fields, and check fields.

Data fields

Data fields accept data of a particular kind directly from the keyboard. The Indep, H-Tick, and V-Tick fields in the above example are data fields. (These fields—and others on this input form—are explained in chapter 4, "Plotting graphs".)

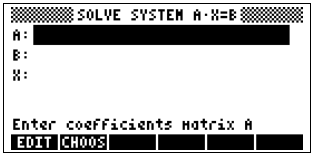
To enter or change the data in a data field:

1. Press an arrow key until the field is highlighted.
2. Press EDIT. Any data in the field is copied to the command line.
3. Enter or edit the data on the command line. (See "Using the command line" on page 2-7 for information.)

   Where the data is also the name of a variable, your entry will be evaluated and replaced with the variable's object. To use the name of a variable rather than the associated object, enclose the name in single quotes (that is, tick marks).
4. Press (ENTER) to copy the new data to the input form.

Extended data fields

Extended data fields accept data entered directly from the keyboard or objects chosen from a list. The three fields in the example at the right are extended data fields.



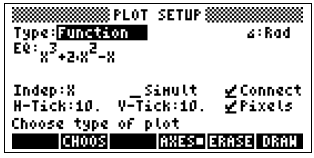
To enter data into an extended data field directly from the keyboard, follow the steps set out in the paragraphs on data fields above.

To choose a previously stored object:

1. Highlight the field and press CHOOS. A list of all suitable variables in the current directory is displayed.
2. Press ▲ or ▼ until the object you want to select is highlighted.
3. Press OK. The object you selected is copied to the input form.

List fields

List fields accept only a limited, predetermined set of values. The Type and ∡ fields in the example at the right are list fields.



To change the value in a list field:

1. Highlight the field and press CHOOS. A list of allowable values is displayed.
2. Use the arrow keys to highlight the value you want.
3. Press OK. The value you selected is copied to the form.

You can also select an item for a list field by:

- highlighting the field and pressing +/- until the option you want appears in the field or
- highlighting the field and pressing ALPHA followed by the first letter of the option you want (and repeating if necessary).

Check fields

Check fields are used to turn an option on or off. The CONNECT, SIMULT, and PIXELS fields in the above example are check fields. A tick in a check field indicates that the option is selected; an empty field indicates that it is not selected.

To change the currently selected option in a check field, highlight the field and press CHK. If the field had a tick before, it is now blank (indicating that you have turned the option off). If it was blank before, it will now have a tick (indicating that you have turned the option on).

Some input form fields are both a data field and a list field. When such a field is highlighted, both the EDIT and CHOOS commands are available from the menu. You can either enter a new value for such a field, or select the value from a list.

Resetting values to their defaults

To reset a value in an input form field to its default value:

1. Move the cursor to the field.
2. Press (NXT).
3. Press RESET.
4. If you want to reset the values in *all* fields on the input form, press ▼ to select RESET ALL.

   The first option in the options list—RESET VALUE—restores just the value in the highlighted field to its default value. The second option—RESET ALL—restores all values on the form to their default values.
5. Press OK or (ENTER).

Input form help

In addition to the help message that prompts you for input, further help is provided by way of a list of valid object types for a field. To display this list for a particular field:

1. move the cursor to the field
2. press TYPES (found on the second page of the function key menu).

To hide the list of valid object types, press (CANCEL).

Using calculated values as input

With an input form displayed, you can perform a calculation and place the result of the calculation directly into a field.

1. Move the cursor to the field whose value you wish to calculate.
2. Press CALC.

   The CALC command is on the second page of the function key menu.
3. Perform the desired calculation.
4. If it is not already a real number, convert the result to a real number by pressing ↱ →NUM.
5. Press OK to return to the input form. The result to the calculation will be in the field you highlighted at step 1.

Closing an input form

An input form might be used to make global changes—for example, changing the date or time—or to set up the parameters for some other operation (such as setting the coordinates for plotting a particular equation).

If your input form will change global settings, press OK. This saves your settings and closes the form.

If your input form is designed to record the parameters for some further operation, a menu key is displayed representing that further operation. (For example, the input forms for plotting a graph will display a menu item labelled DRAW. Pressing the corresponding function key causes the equations specified to be drawn according to the parameters specified on the input forms. (See chapter 4, “Plotting graphs” for more information on plotting.)

To close an input form and discard the values you have entered, press CANCEL.

Modes

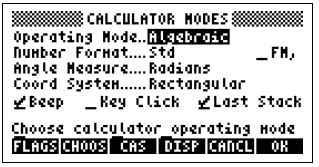
A mode is a way in which the HP 49G behaves. There are numerous modes. For example, one mode is the way that numbers are displayed (with a fixed number of decimal places, in scientific notation, and so on). Another mode controls the units in which angular measurements are interpreted: degrees, radians, or gradians.

Changing a mode

Each mode has a default setting. To change a setting:

1. Press (MODE).

   The Calculator Modes input form is displayed. This input form enables you to change the settings of those modes that are most likely to need changing. It also gives you access to input forms for changing display modes and CAS modes.

   The modes that can be changed are discussed in the next three sections.

2. Change the setting of a mode.

   See “Input forms” on page 2-14 for information on changing the values in fields on input forms.

3. Press OK.

Calculator Modes

The calculator modes are:

- **Operating mode:** controls how the HP 49G interprets and displays calculations. (See “Algebraic and RPN modes” on page 2-21.)
- **Number format**: controls how numbers are displayed and the number of decimal places displayed. (See “Number displays” on page 2-9.)
- **Angle measure:** controls the units in which angular measurements are interpreted: degrees, radians, or gradians.
- **Coordinate system:** controls how complex numbers and vectors are displayed. (See chapter 8 for more information.)
- **Beep:** a check field that enables you to turn on or turn off the system beep.

- **Key click:** a check field that enables you to turn on or turn off the beep that sounds when you press a key.
- **Fraction mark** (labelled "FM"): a check field that enables you to change the punctuation used to separate the integer from the fractional component of a real number. The default is a period. To use a comma, place a check mark in this field.
- **Last stack**: a check field that enables you to save memory by disabling the undo function. Note that the ANS command requires the Last stack field to be checked.

Display modes

Display modes determine the size of the font in history, on the command line, and in Equation Writer. They also determine the font used, the number of status lines displayed (0,1, or 2), and whether and how the clock is displayed.

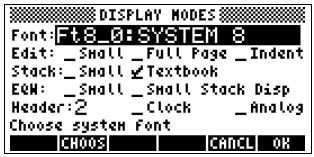
To change a display mode:

1. Press (MODE).

   The Calculator Modes input form is displayed.

2. Press DISP.

   The Display Modes input form is displayed.



3. Change the setting.
4. Press OK.

The display modes are:

- **Font:** enables you to choose a particular font as the standard system font.
- **Edit Small:** enables you to choose the minifont for command line entries. (The minifont is a small 6-pixel-by-4-pixel font.)
- **Full Page:** enables the cursor to be placed anywhere on the screen during editing rather than being restricted to the text being edited.
- **Indent:** switches on automatic line indenting in multi-line command line entries.
- **Stack: Small:** enables you to choose the minifont for the history and stack display.

- **Textbook:** enables you to display expressions and equations in single-line format (with /, ^, etc) instead of traditional textbook format (with stacked fractions, raised exponents, etc).
- **EQW Small:** enables you to choose the minifont for entries in Equation Writer.
- **EQW Small Stack Disp:** enables you to display equations and expressions in the minifont while other objects are displayed in the system font. This has effect only if you are in textbook mode.
- **Header:** determines the number of lines of information displayed in the header—that is, in the status area—of the screen. Valid values are 0, 1, and 2.
- **Clock:** enables you control whether the date and time are displayed.
- **Analog:** enables you choose between a digital and analog format for the clock display.

CAS modes

Certain modes relate to the HP 49G's computer algebra system (CAS). Some examples are the default independent variable, modulo variable, and complex number display. CAS modes are discussed in detail in chapter 5.

To change a CAS mode:

1. Press (MODE).

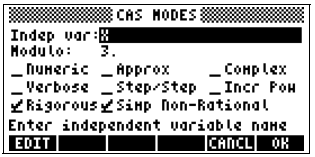
   The Calculator Modes input form is displayed.

2. Press CAS.

   The CAS Modes input form is displayed.

3. Change the setting.

4. Press OK.



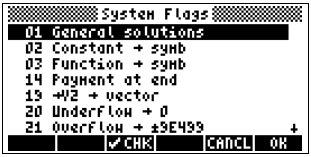
Flags

The modes that you are more likely to want to change can be changed easily using the input forms described in the last three sections. There are, however, many more modes that you can change.

These additional modes can be changed by setting or clearing certain flags. For example, by setting flag –60, you can lock the alpha keyboard by pressing (ALPHA) once, rather than twice. Clearing flag –60 returns the mode to its default setting (where (ALPHA) must be pressed twice to lock the alpha keyboard).

You can display a list of flags by pressing FLAGS when the Calculator Modes input form is displayed. With the list displayed, you can set or clear particular flags.

To set or clear a flag:



1. Press ▼ or ▲ until the flag you want to change is highlighted.
2. Press CHK.

   If the flag was set before, it is cleared; if it was cleared before, it is now set. (The flag is set if it has a check mark beside it.)

Algebraic and RPN modes

The HP 49G provides two modes for interpreting and displaying calculations: algebraic and RPN.

Algebraic mode

Algebraic mode is the default mode. In this mode, you perform calculations by entering the arguments *after* the command (which, in most cases, means entering numbers, functions, and operators in the same order that you would write down the expression on paper). For example, to find sin(30) in algebraic mode, you enter the command—SIN—and then the argument: 30.

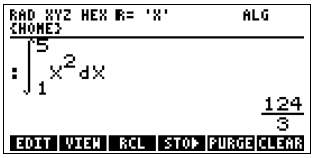
You enter the command and its arguments on the command line and:

- press ENTER to obtain the result in exact mode, or
- press ↵ →NUM to obtain the result in approximate mode.

Exact mode and approximate modes are explained on page 2-22.

If a calculation yields a number of results, the results are displayed together in a list: {result$_1$, result$_2$, result$_3$, …}.

In algebraic mode, previous calculations are retained in history together with their results. Each calculation is displayed at the left of the screen, and the corresponding result is displayed on the next line at the right of the screen (as in the example on the right).



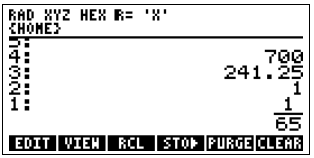
You can use the result of a previous calculation in a new calculation by entering ANS(n) where n is the number of the answer: 1 for the last answer, 2 for the second last, and so on. When you press ENTER, the corresponding answer is copied to the cursor location on the command line.

RPN mode

"RPN" stands for *reverse Polish notation*. In RPN mode, you typically enter an argument *before* the command. For example, to find sin(30) in RPN mode, you enter the argument —30—and then specify the command: SIN.

In RPN mode, the results of previous calculations are listed as they are in algebraic mode. However, only the results—not the calculations—are listed.

This list of prior results—and other objects—is known as the *stack*, and each item on the stack is numbered (as in the example at the right).



If a calculation yields a number of results, each result is displayed as a separate item on the stack. (Some results may, however, be given as a list of results.)

The HP 49G has numerous commands for manipulating the objects on the stack. See appendix E, "Working in RPN mode".

For information on switching between algebraic and RPN display modes, see "Changing a mode" on page 2-18.

Exact and approximate modes

The results of calculations can be displayed in exact mode or approximate mode. The default results mode—for both algebraic and RPN display modes—is exact.

See "Changing a mode" on page 2-18 for information on how to change modes. See chapter 5, "Working with expressions", for information on how this mode affects computer algebra functions.

Exact mode

In exact mode, any result that is not a whole number is displayed in fractional or symbolic form. For example, 4 ÷ 2 will yield 2 (because 2 is a whole number), while 5 ÷ 2 will yield 5/2 (since 2.5 is not a whole number).

Similarly, sin(π/4) yields $\sqrt{2}/2$ rather than 0.707106781185.

Further examples are given in “Command line calculations” on page 2-24.

Note that you can force the calculator to yield an approximate answer while in exact mode by:

- entering at least one integer as a real number—that is, by following the integer with a decimal point—see “Integers and real numbers” on page 2-8, or
- pressing ↱ →NUM rather than ENTER to get the result.

Approximate mode

In approximate mode, all numeric results are displayed in floating-point form where possible.

For example, sin(π/4) yields.707106781185 rather than $\sqrt{2}/2$.

Further examples are given in “Command line calculations” on the next page.

Command line calculations

This section provides a number of examples of common types of calculations. The keystrokes needed—in algebraic mode—to enter the calculation on the command line, and the result in both exact and approximate mode, are listed. (The examples assume that the calculator is operating with its default mode settings.)

Chapters 5 and 6 explain how to use the commands and functions of the calculator's computer algebra system to set up and solve more-complex calculations. See chapter 5 for information on how to configure modes to get symbolic results to calculations.

Example 1: $(5 + 3) \times (6 - 3)$

Keys: ◀ ( ) 5 + 3 ▶ × ◀ ( ) 6 − 3 ENTER

Exact: 24

Approximate: 24.

Example 2: $\sqrt{45}/12$

Keys: √x 45 ÷ 12 ENTER

Exact: $\sqrt{5}/4$

Approximate: .559016994375

Example 3: 4^{-2}

Keys: 4 y^x 2 +/- ENTER

Exact: 1/16

Approximate: .0625

Note that the +/- key changes the sign of the last number entered.

Example 4: $\sqrt[4]{2401}$

Keys: ▶ $x\sqrt{y}$ 4 ▶ , 2401 ENTER

Exact: 7

Approximate: 7.

Example 5: $\int_1^5 x^2 dx$

Keys: ▶ ∫ 1 ▶ , 5 ▶ , x y^x 2 ▶ , x ENTER

Exact: 124/3

Approximate: 41.33333333333

Example 6: $\sqrt{\cos\frac{\pi}{3}}$

Keys: √x COS ◀ π ÷ 3 ENTER

Exact: $\sqrt{2}/2$

Approximate: .707106781185

Time Management

By default, the HP 49G does not show the date and time. You can turn this function on by selecting CLOCK on the Display Modes input form (as explained on page 2-19). When the clock function is on, the date and time appear on the second line of the status area.

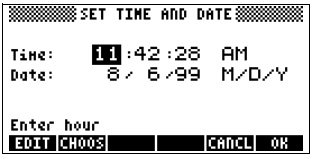
Even if you have chosen not to display the clock, you can use the appointments feature of the HP 49G to set reminders or to set programs to run at a specified time.

Setting the date and time

To set the date or time:

1. Press ↱ (TIME).
2. Press ▼▼ to highlight the SET TIME, DATE... function and then press OK.

   The Set Time and Date input form is displayed.



3. Press the appropriate arrow keys to highlight a value you want to set or change.
4. Change the value. (Each time and date field on this input form is both a data field and a list field. See “Input form fields” on page 2-14 for information on how to edit the fields on an input form.)
5. Repeat from step 3 if there are other values you want to change.
6. When all the values are correct, press OK.

The input form closes and the new date and time is displayed on the status line (providing that you have chosen to display the clock and the status area).

Changing the format of the date or time

To change the format of the date or time:

1. Press ⇨ TIME.
2. Press ▼▼ to highlight the SET TIME, DATE... function and then press OK.

   The SET TIME AND DATE input form is displayed.
3. Press the appropriate arrow keys to highlight the format field you want to change.

   The format fields are the two fields at the far right of the screen.
4. Change the format. (The format fields are list fields. See "Input form fields" on page 2-14 for information on how to edit list fields on an input form.)
5. If you want to change another format, repeat from step 3.
6. When you have finished, press OK.
7. The input form closes and the date and time is displayed in the formats you set.

Alarms

You can set two types of alarms: appointment alarms and control alarms.

Appointment alarms

An appointment alarm is an alarm you set to go off at a particular time on a particular date. Typically, an appointment alarm is accompanied by a user-set message, for example, a reminder.

When the alarm falls due, a beep is emitted at short intervals for about 15 seconds. If you also specified a message when setting the alarm, that message is displayed in the status area, along with the alarm annunciator ((•)). The message is displayed only while the alarm is sounding.

You acknowledge an appointment alarm by pressing a key while the alarm is sounding. The beep stops, the annunciator disappears, and the message is deleted.

If you do not press a key while the alarm is sounding, the message disappears, but it is not deleted. (See "Checking, changing, and deleting alarms" on page 2-29 for information on following up alarms that you have missed.) If the alarm is a non-repeating alarm (explained in the next

section) the annunciator remains displayed to indicate that you have an appointment you have not acknowledged.

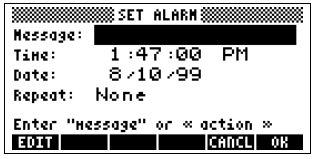
If the calculator is switched off, it automatically switches on when the alarm is due to go off. The alarm sounds, and the associated message is displayed.

Any number of appointment alarms can be set.

Setting an appointment alarm

1. Press ↱ (TIME).
2. Press ▼ to highlight the SET ALARM... function and then press OK.

   The SET ALARM input form is displayed.



3. If you want to set a message that will be displayed when the alarm goes off:
   a. Press ↱ (" ").

      If you use any other delimiter, the HP 49G will consider the alarm to be a control alarm (see page page 2-29).
   b. Enter the message. (See “Entering characters” on page 2-10 for information on how to enter text.)
   c. Press OK.

   Only as much of your message as will fit on one line of the screen will be displayed, so you should keep your message brief.
4. If you have entered a message, the Hour field is now highlighted. If you did not enter a message, press ▼ until the Hour field is highlighted.
5. Change the time, time format and date to the time and date that you want the alarm to sound. (See “Input form fields” on page 2-14 for information on how to set the fields on an input form.)
6. If you want the alarm to repeat at regular intervals:
   a. Highlight the Repeat field.
   b. Type a value for the repeat interval.
   c. Press OK. The unlabeled Alarm Repeat Unit field is now highlighted.
   d. The Alarm Repeat Unit field is a list field. If the default alarm repeat unit is not what you want, select a new unit: seconds, minutes, hours, days, or weeks. (See “Input form fields” on page 2-14 for information on how to select values for a list field on an input form.)
7. Press OK to set the appointment alarm.

Checking, changing, and deleting alarms

To look at the future-dated appointment alarms you have set, and the past-due non-repeating alarms that you did not acknowledge:

1. Press ↱ (TIME).

   The BROWSE ALARMS... option is highlighted.

2. Press OK.

   A list of past-due non-repeating alarms and future-dated alarms is displayed. The list shows the date and time the alarm was set to go off, whether it is a repeating alarm, and the first few characters of the message.

3. To read or change a listed alarm, press ▼ to highlight the alarm and then press EDIT. The SET ALARM input form is displayed. You can read the entire message and change the details of the alarm. See "Setting an appointment alarm" on page 2-28 for information on changing the data on the SET ALARM input form.

   To return to the list of alarms, press CANCEL or OK.

4. To delete an alarm, press ▼ to highlight the alarm and then press PURGE.

   If you do not delete a past-due alarm—that is, a non-repeating alarm that you did not acknowledge by pressing a key while the beep was sounding—the alarm annunciator will continue to be displayed in the status area.

5. To set a new alarm, press NEW and follow the instructions in "Setting an appointment alarm" on page 2-28, starting from step 3.

6. To return to your default display from the list of alarms, press OK.

Control alarms

A control alarm runs a program or other object at the time and date you specify. You might set a control alarm to run a program at a time when you won't need the calculator if you know that the program will take some time to finish.

You do not need to acknowledge a control alarm. In fact, when a control alarm is set off, there is no beep and no annunciator.

You can view, change, and delete a control alarm in the same way that you view, change, and delete an appointment alarm. See "Checking, changing, and deleting alarms" on page 2-29.

Setting a control alarm

1. Press ↱ (TIME).
2. Press ▼ to highlight the SET ALARM... option and then press OK.
   The SET ALARM input form is displayed.
3. In the Message field, enter the name of the program or object that you want to run when the alarm becomes due.
4. Set the time and date to the time and date that you want the object to run.
5. If you want the object to run repeatedly at set intervals, enter a value in the Repeat field and select a unit for the Alarm Repeat Unit field.
6. Press OK to set the control alarm.