HP 50g Graphing Calculator Quick Start Guide

Edition 1
HP Part Number: F2229-90201

HP 50g Graphing Calculator

Keyboard Map Legend

Number	Feature	Number	Feature
1	Context-sensitive menu items	11	Numerical result
2	Tool menu	12	Units menu
3	Mode menu	13	Alphabetic entry
4	Next key	14	Backspace (delete and clear)
5	Tick key	15	EquationWriter
6	Numeric and Symbolic Solvers	16	Cursor keys
7	Shift keys	17	Context-sensitive menu keys
8	On/Off/Cancel keys	18	Graphing functions
9	Space key	19	Screen display
10	Enter key	20	Header area

The table above and the photo on the previous page illustrate just a few of the many features available on the HP 50g Graphing Calculator. These topics, as well as other features of the calculator, are discussed in the following quick start guide. For a complete list of features of the HP 50g Graphing Calculator, refer to the *HP 50g Graphing Calculator User's Manual,* the *HP 50g Graphing Calculator User's Guide*, and the *HP 50g/49g+/48gII Advanced User's Reference*. These manuals are found on the HP website, **www.hp.com**.

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1   Getting Started

Welcome to your HP 50g Graphing Calculator

Congratulations on the purchase of your new calculator! The 50g is a very powerful graphing calculator based on the HP-48 series of calculators, which were designed specifically for engineers and mathematicians. Once you perform multiple calculations and work actual engineering or math problems with the 50g, you will appreciate the variety of tools available and the many ways advanced problems can be solved with this calculator.

Before getting into specifics about the operation of the calculator, you may wish to read through Table 1-1 on page 26 to familiarize your-self with some common questions associated with the using this calculator.

This quick start guide is intended to be read from start to finish, and it should take about an hour to complete. It will introduce you to the most important features used for solving general math problems, show you many shortcuts, and identify common problems new users often encounter. In addition, it will point you to locations where more detailed information can be found. In-depth explanations of operations are not found here; a simple, step-by-step approach to problem solving is applied. **As you proceed through the quick start guide, examples use concepts, skills, and operations introduced in earlier sections.** For example, at some point, you may be asked to work with an equation that you stored in an earlier section. If you have not started from the beginning, you will not have this equation, and your results may vary. Although it is tempting to jump through the manual to find interesting parts, every step and section in this booklet is designed to outline important information and teach you useful techniques in a specific progression. **Thus, it is highly recommended you take the time to understand the concepts in the order in which they are introduced.** With a little time and practice, you will be solving problems and performing advanced calculations with ease.

For more detailed information about the 50g Graphing Calculator, refer to the *HP 50g Graphing Calculator User's Manual,* the *HP 50g Graphing Calculator User's Guide,* and the *HP 50g/49g+/48gII Advanced User's Reference.* These manuals are found on the HP website, **www.hp.com**, and are cited throughout this manual; it is highly recommended you refer to these manuals to thoroughly familiarize yourself with the many features of your calculator.

The 50g is capable of performing operations in both Algebraic and Reverse Polish Notation (RPN) modes. Although Algebraic is the default operating mode, it is highly recommended you take the time to learn RPN, as many of the 50g's features work more efficiently when performed in RPN. For more detailed information about RPN, visit **www.hp.com/calculators**.

Manual Conventions

This manual makes use of certain conventions with text to differentiate between key presses and on screen display options.

- Keyboard keys are represented by CAPITAL letters.
- The symbols ⟵ and ⟶ represent the left-shift and right-shift keys, respectively. These symbols, when followed by CAPITAL letters or key symbols, indicate shifted functions of the keyboard keys.
- Menu items for menu keys are also spelled out in CAPITAL letters, followed by the term, *menu key*.
- Field names, choose box options, and other on screen text appear in **BOLD**.
- UP, DOWN, LEFT, RIGHT refer to the silver cursor keys.
- Letters of the alphabet are indicated by ALPHA followed by the keyboard key on which the letter appears. For example, to type the letter C, press ALPHA F3(C).
- Numbered keys are represented simply by printed numbers: 1, 5, 123.35, etc.

Occasionally, symbols of the actual keys may be used for clarification in long command sequences. Some key commands require you to press and hold a shift key while simultaneously pressing one or more keys. These commands are spelled out specifically in the text.

Keyboard, Menus, and Annunciators

1. To begin, press ON. With the power on, the ON key becomes CANCEL. Press ON to cancel an operation and clear the screen display. Press the TOOL key. Notice that there are six items at the bottom of the screen. These items make up a *menu* (see Figure 1). To use a menu, press the key directly beneath the desired menu item. This menu will change as you use the calculator.

Figure 1

2. Notice how there is both a white function and an orange function printed above most keys on the keyboard. There is also a yellow character printed on the right side of most keys. Look at the orange function above ON. Press the orange right-shift, ⟶, followed by ON, and the unit powers off.

3. Press ON to turn the calculator back on. Now hold down ON and simultaneously press the ⊕ key repeatedly. The screen darkens. Notice the six symbols that appear at the very top of the screen. These symbols are called *annunciators*. The three on the left indicate that a shift key, left, right, or Alpha, is active. Following the Alpha key annunciator is the low battery annunciator and the busy annunciator, and the communication annunciator is at the far right. Press and hold the ON key. With ON pressed, simultaneously press the ⊖ key repeatedly until the screen is at a contrast you prefer.

4. If the calculator during operation is non-responsive, or seems locked up, press CANCEL a few times. If it doesn't respond, you may reboot the machine by pressing and holding ON and simultaneously pressing the F3 key. Release the F3 key, followed by ON. When you release the ON key, the calculator reboots. This is called a *warmstart*. To clear all your memory from RAM, press and hold the ON, F1, and F6 keys simultaneously. Release F6, then F1, then ON. After a beep, the screen displays, **Try to Recover Memory?**, with YES or NO menu key options. Press the NO menu key. If nothing happens, push any key. After the beep, press the NO menu key.

5. The following steps in this manual assume you have cleared your memory, and you have no extra programs installed. If you have not cleared the memory, results presented in the guide may vary from your own. **Please clear all your memory as described in step 4 above before preceding.**

6. Now that your 50g is ready to go, let's look at the screen (see Figure 2). The top section is called the *header*. The header displays important information about the status of the calculator: **RAD XYZ HEX R= 'X' ALG** and **{HOME}**. These groups of letters indicate the calculator is set for radians, Cartesian coordinates, the Hexagesimal number base, real numbers with exact results, 'X' as the default variable, and Algebraic operating mode. **{HOME}** means you are in the *Home* directory. As we work, note how the information in the header changes. Don't worry what everything means right now.
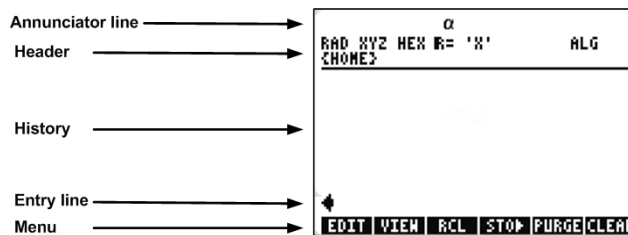

Figure 2

7. The main, or middle area of the screen is called the history, or the *stack*. This is where your numbers and equations appear as you work. The bottom portion is where the edit, or *entry line*, and the menu appear. For more information on the keyboard, menus, and the calculator display, see Chapter 1 of the *HP 50g Graphing Calculator User's Manual* or the *HP 50g Graphing Calculator User's Guide*.

Basic Math

8. To begin, type 1⌈ + ⌉1. Notice the entry line and the blinking cursor. Press ENTER. The result, **2**, is returned at the far right.

9. Now press the UP cursor key twice to select **1+1**. Press the EDIT menu key to open a tool called the *EquationWriter*. The EquationWriter allows you to write complex equations very easily and see them exactly as they might appear on paper (see Figure 3).


Figure 3

10. With **1+1** highlighted, press the ⌈ ÷ ⌉ key followed by the number 5. Notice how it is displayed just as you might write it out on paper, $\frac{1+1}{5}$, along with the blinking cursor. Press ENTER to return the equation to the editline, then ENTER once again to evaluate it. The result is $\frac{2}{5}$. What is going on here?

11. Notice up in the header the **R=** symbol. Recall this means that the calculator is in exact mode. Keep your eye on that **R=**. While holding down the ⌈ ↱ ⌉ key, simultaneously press ENTER. The **R=** toggles to **R~**. Do it a few times and see how it changes. Before preceding to the next step, leave it set as **R~**.

12. Now press ⬅ followed by HIST(CMD). A box called a *choose box* with your last four typed entries is shown. With **(1+1)/5** selected, press the OK menu key followed by ENTER. This time, the result is **.4**. As a general rule, you can think of exact mode solutions, **R=** , as combinations of fractions, integers, square roots, equations and values of PI. In approximate mode, **R~**, everything is evaluated to a single, numerical answer.

13. Press the UP cursor key and observe how line two, above the highlight, now displays **(1.+1.)/5.**, and line four displays **(1+1)/5**. The extra periods after the numbers indicate approximate mode instead of exact mode. We will elaborate on this difference later. Press CANCEL followed by the CLEAR menu key. Your stack is now cleared. For more information about creating and entering basic expressions, see Chapter 2 of the *HP 50g Graphing Calculator User's Manual* or the *HP 50g Graphing Calculator User's Guide*.

Using RPN

The 50g comes from a history of calculators designed specifically for engineers and mathematicians. As such, it has very powerful tools that permit you to enter, work with, and solve math problems quickly and efficiently. One of these tools is Reverse Polish Notation, (RPN). RPN's greatest strength is that it lets you work out problems one small piece at a time. You don't have to type everything into a long equation and worry about using parentheses to set the order of operation. Because the 50g comes from a line of calculators that used RPN exclusively, the calculator is easier to use and functions most effectively in RPN mode.

14. Let's change a few settings on our unit and get into RPN mode. Press the MODE key. A screen called an *Input Form* appears. These full screen forms are used for a variety of tasks. On this screen, titled, **Calculator Modes**, many basic settings are shown. To begin, press the FLAGS menu key. Press the UP cursor key until you reach **117 CHOOSE boxes**. Press the CHK menu key to toggle to **Soft Menu.** Press ENTER to return to the input form.

15. Press the UP cursor key five times. Notice how the menu and help text directly above the menu changes as you select different fields. Once back on the first field, see how **Algebraic** is selected. Press the CHOOS menu key and a *Choose Box* appears (see Figure 4). Press the DOWN cursor key to select **RPN**, then press ENTER. **RPN** appears in the first field, and it now will be the active operating mode when the input form is closed. Choose boxes in input forms can also be changed by pressing +/- with a field highlighted. Press this key a few times and note how it toggles between RPN and Algebraic. With RPN selected, press ENTER again to save your settings and exit the input form.
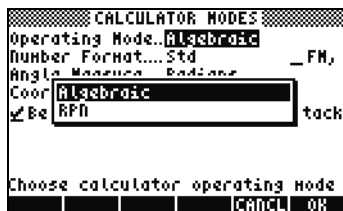
Figure 4

16. Upon exiting, you will notice that the left side of the screen has numbers from 1-7 (see Figure 5). Press the 2 key, followed by the SPC key. Press the 3 SPC 4 keys, in that order, followed by ENTER. The three numbers appear on different *levels* of the stack, numbered 1-7. The number **2.** is on Level 3 of the stack, as it corresponds to the number **3:** on the left. Also, check the header. When the calculator is in RPN mode, the **ALG** annunciator is no longer displayed (see Figure 6).

17. Press ENTER again and notice how a copy is made of Level 1 on the stack (see Figure 7). This is a useful feature, as it allows you to save your previous work. Let's now multiply 4x4. Since 4 is already stored on both Level 1 and Level 2, simply press ✕. The result, **16.**, is placed on the stack, and the other two numbers move down. You now should have, from top to bottom, **2.**, **3.** and **16.** on the stack.

Figure 5

Figure 6

Figure 7

RAD XYZ HEX R~ 'X'	RAD XYZ HEX R~ 'X'	RAD XYZ HEX R~ 'X'
{HOME}	{HOME}	{HOME}

```
RAD XYZ HEX R~ 'X'
{HOME}
7:
6:
5:
4:
3:                    2.
2:                   16.
1:                    3.
EDIT | VIEW | RCL | STO▶ |PURGE|CLEAR
```

```
RAD XYZ HEX R~ 'X'
{HOME}
7:
6:
5:
4:
3:
2:                    2.
1:          5.33333333333
EDIT | VIEW | RCL | STO▶ |PURGE|CLEAR
```

```
RAD XYZ HEX R~ 'X'
{HOME}
7:
6:
5:
4:
3:
2:
1:          28.4444444444
EDIT | VIEW | RCL | STO▶ |PURGE|CLEAR
```

| Figure 8 | Figure 9 | Figure 10 |

18. Let's calculate 16/3. However, the numbers are in the wrong order on the stack for this operation. No problem, press the RIGHT cursor key to *swap* their positions (see Figure 8). Now press $\div$ and **5.33** (repeating) appears. Let's square that result by pressing the RIGHT cursor key to swap Levels 1 and 2, followed by the Y^x key. The final result, **28.44** (repeating) appears.

19. Press $\rightarrow$ followed by $\longleftarrow$ (BACKSPACE) to clear the stack.

20. Now let's work a more complex problem to show how RPN allows you to break down complex problems into simpler steps.

21. Calculate: $x = \sqrt{\dfrac{(8.33(4-5.2)) \div [(8.33-7.46)0.32]}{4.3(3.15-2.75)-(1.71)(2.01)}}$.

    To work this problem using RPN, break the larger problem down into smaller pieces. As you work through this example, watch and note how the more complex problem becomes a series of simple parts as you work it out. Start on the inside of the parentheses and work outwards. Begin by solving the upper part of the equation inside the square root. Type 8.33 ENTER 4 SPC 5.2 followed by $-$. See how the result is calculated with **8.33** and **-1.2** on the stack. Press $\times$ and move on to the next group of numbers. Type 8.33 SPC 7.46 followed by $-$. **.87** appears on the stack. Type .32 followed by $\times$ to multiply those numbers. You now have **-9.996** and **.2784** on the stack (see Figure 11). Press $\div$ to divide those numbers. You have now solved the upper half of that equation. The intermediate result is **-35.905...**

Figure 11

22. Moving on the lower half, type 4.3 ENTER 3.15 (SPC) 2.75 (—), followed by (×). **1.72** appears and you can move on to the next part. Type 1.71 ENTER 2.01 followed by (×) to return **3.4371**. Press (—) and you have now solved the lower part of the equation. Press (÷) to divide the top from the bottom, followed by ($\sqrt{x}$) to find the square root. The final result, **4.5727…** is returned. For more information about RPN, see Chapter 2 of the *HP 50g Graphing Calculator User's Manual* or **www.hp.com/calculators**.

Working in Algebraic Mode from RPN Mode

23. Let's now work the previous problem in Algebraic mode. You can actually use Algebraic mode with RPN set as the active operating mode. Press the Tick key, ('), and note '' appears on the editline. Note how the **ALG** annunciator also returns to the header, indicating Algebraic mode is now active. As an exercise, try to repeat the last example by typing the entire expression in as a single equation.

24. The exact keystroke sequence after pressing (') is: ($\sqrt{x}$) (↰) (—) (8) (•) (3) (3) (×) (↰) (—) (4) (—) (5) (•) (2) RIGHT cursor (÷) (↰) (—) (↰) (—) (8) (•) (3) (3) (—) (7) (•) (4) (6) RIGHT cursor (×) (•) (3) (2) RIGHT cursor (÷) (↰) (—) (4) (•) (3) (×) (↰) (—) (3) (•) (1) (5) (—) (2) (•) (7) (5) RIGHT cursor (—) (1) (•) (7) (1) (×) (2) (•) (0) (1) ENTER. The equation should appear as it might be written out on paper.

25. Press (↱) followed by ENTER(->NUM) to return the same numerical result, **4.5727…** There are 66 keystrokes in Algebraic mode compared to 61 with the RPN solution. However, you may have added some keystrokes with editing in order to get all the parentheses in their correct locations. While RPN generally requires fewer keystrokes, having the ability to break problems into smaller pieces helps you catch mistakes early on and avoid long, consecutive key sequences.

26. With RPN as the active operating mode, you can still use Algebraic mode at anytime. Press ⌐'⌐ so '' appears on the editline. You can now enter data just as you normally would in Algebraic mode. For example, with '' on the editline, type 2 ⌐+⌐ 2 ⌐×⌐ 4 ⌐Yˣ⌐ 2 . When you are done, press ENTER and notice how your equation appears on the stack. Press ENTER to duplicate it, and then ⌐↱⌐ followed by ENTER (->NUM) to return a final numerical result.

27. Another option for entering equations and expressions is the EquationWriter. Press ⌐↱⌐ followed by ⌐'⌐ (EQW) to open the EquationWriter (see Figure 12). Let's type in and solve a problem using the Pythagorean theorem. Type 14 ⌐Yˣ⌐ 2 followed by RIGHT cursor ⌐+⌐ 20 ⌐Yˣ⌐ 2 then RIGHT cursor RIGHT cursor followed by ⌐√x⌐ . You now have the equation entered into the equation writer (see Figure 13). Now press the EVAL menu key, followed by ⌐↱⌐ then HIST (UNDO). The EVAL menu key evaluates what is currently highlighted, and the UNDO command will *undo* your last command. Now with the whole equation highlighted, as shown in Figure 13, press ⌐↱⌐ then VAR (COPY). We will use this later. Now press ENTER. Your equation is now on the stack. Press ⌐↱⌐ then ENTER (->NUM) to evaluate your problem. The hypotenuse is ~**24.413**.
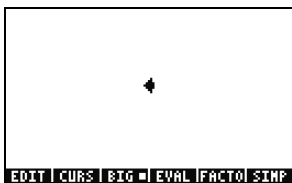
Figure 12
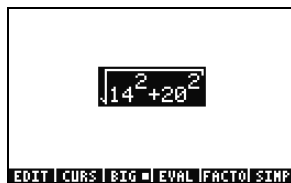
Figure 13

Figure 14

Using Equation Solvers

28. Let's say you have to work several problems involving the Pythagorean Theorem from the last example. Rather than typing them all in individually, wouldn't it be nice to solve any part of the formula? The many built-in solving tools, including HP Solve, can help you do this.

29. There are two major types of solvers on the 50g: numeric and symbolic. Let's examine the Numeric Solver first. Press ⇨ followed by 7(N.SLV). A choose box appears. Press 3 and note how the highlight jumps to the corresponding item. Press 1 to jump back to **Solve Equation** and press ENTER.

30. A full screen solver appears (see Figure 15). To begin, we must enter an equation to solve. Rather than typing it all in at once, let's use the EquationWriter again. Press ⇨ followed by (') (EQW). Now let's paste in the formula we copied from the last example by pressing ⇨ followed by (NXT) (PASTE). The whole expression is highlighted as shown in Figure 13. Let's rewrite this to be $A^2 + B^2 = C^2$. Press ⇦ followed by (⬅) (DEL) to remove the square root function (see Figure 16). Now press the CURS menu key and notice a cursor appears on a box around 14^2. Use the cursor keys to move the cursor and the box around the equation. As you move, note how you can select individual items, or groups of the whole expression. Use the RIGHT and DOWN cursor keys so the box surrounds only the **20** and then press ENTER to select **20** (see Figure 17).
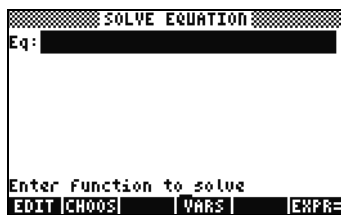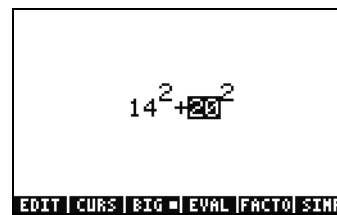
| Figure 15 | Figure 16 | Figure 17 |

31. Press the (ALPHA) key to access the letters of the alphabet printed in yellow on the keys. Press (ALPHA) followed by F1 (A) and note how the **20** is replaced by a letter **A** (see Figure 18). Press the cursor keys as follows: UP UP LEFT DOWN to highlight the **14**. Press (ALPHA) followed by F2 (B) to replace the **14** with a letter **B** (see Figure 19). Press the cursor keys, UP UP, followed by (⬅) then RIGHT cursor. The B^2 term moves to the left (see Figure 20). Press (⬅) then LEFT cursor and it moves back. Position it so the equation reads $A^2 + B^2$. Press UP until the entire expression is highlighted. Press ⇨ followed by (+/−) to insert an equals sign, =, then (ALPHA) followed by F3(C) (Yˣ) 2. You now have the full $A^2 + B^2 = C^2$ (see Figure 21). Press ENTER.
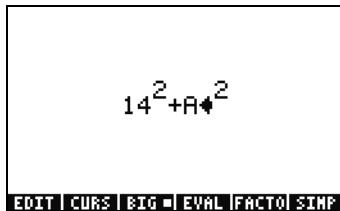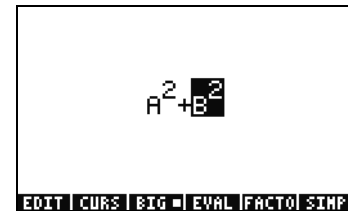
Figure 18

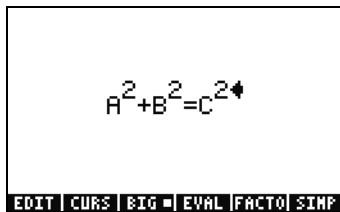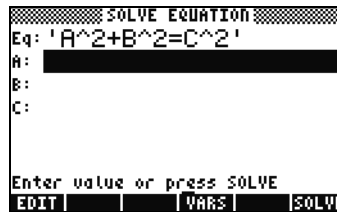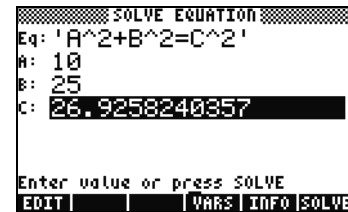
Figure 19

Figure 20

Figure 21

Figure 22

Figure 23

32. Notice how your solver screen now has fields to enter values for **A**, **B**, and **C** (see Figure 22). Note **A** is currently highlighted. Type 10 and press ENTER. **A** now has the value **10,** and the highlight moves to **B**. You can also type simple math problems in an input form. For example, type 5 (SPC) 2 (Yˣ) and press ENTER. 5^2, or 25, appears as the value for **B**. Now with **C** selected, press the SOLVE menu key. Shortly, the result **26.9258...** is returned.

33. What if **C** remains the same, but **A** changes to **15**? What should **B** change to? You don't have to rewrite your equation to find out. Press the DOWN cursor key twice to select **A**. Type 15 ENTER and now with **B** selected, press the SOLVE menu key. The result, **22.36...** appears. In this way, any variable in any part of the equation can be solved without re-entering all the data.

34. Numerical solvers can often return several results, especially for functions that are periodic, (SIN, COS), as well as many polynomials. Let's examine how this works.

35. Press DOWN and highlight **C**. Now type in 9 [+/−] [EEX] 30 so **-9E30** is displayed, then press ENTER. A very large negative number appears in **C**. Press UP to highlight **C** again. You have now entered an *initial guess* for the solver. Press the SOLVE menu key and then press any other key other than CANCEL. You will see numbers rapidly converging down to a value. After a few moments, note **-26.9258...** appears. Why? Because -26.9528^2 is the same as 26.9528^2. With many functions, setting a different initial guess will determine which numerical solution appears. For more information about using solvers, see Chapter 6 of the *HP 50g Graphing Calculator User's Manual* or the *HP 50g Graphing Calculator User's Guide*.

Using Units

In physics, engineering, and science calculations, units and unit conversions are often a critical part of problem solving. The 50g lets you work without adding steps to your calculations when units and unit conversions are required. Let's learn how to use them.

36. Imagine that your triangle from the previous problem now has units. We can solve using units as well. Press UP UP to select **A**. Now Press 10 [↱] [—] [ALPHA] [↰] HIST (M) ENTER, followed by 85 [↱] [—] [ALPHA][ALPHA] [↰] [ALPHA] F6 (F) COS (T) ENTER, then 1 [↱] [—] [ALPHA][ALPHA] [↰] [ALPHA] F3 (C) HIST (M) ENTER. You have now entered values with assigned units for **A**, **B** and **C** (see Figure 24). It is necessary to assign units for all three variables so the 50g knows which units to use during the calculation, as the 50g won't know which unit to assign to a variable without a unit. Note how the units are preceded by the underscore edit mark in the key sequence above by pressing [↱] [—].

37. Now press UP to select **C** and press the SOLVE menu key. After a short wait, **2777.092.._cm** is returned (see Figure 25). Type 3000 and press ENTER. Note the currently assigned unit is retained. Press DOWN to select **A** and press SOLVE. The result, **15.125..._m** is returned.

38. Press ENTER to exit to the stack. You will see the variables you solved for labeled with units (see Figure 26). Let's convert the units on Level 1. Press ⟶ followed by 6 (UNITS) for the Units menu.
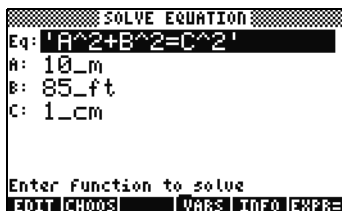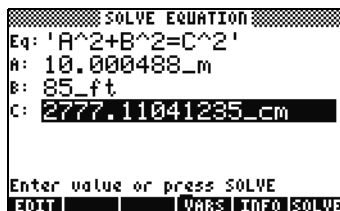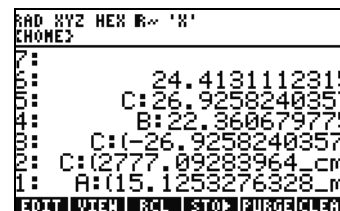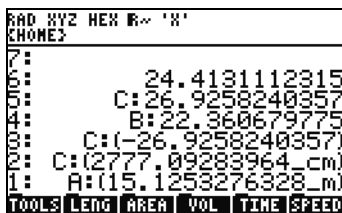

Figure 24

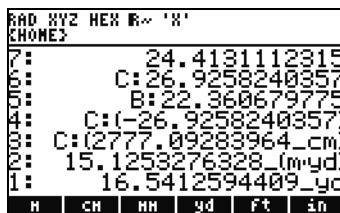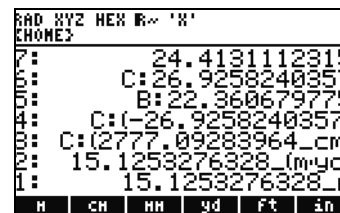Figure 25

Figure 26

Figure 27

Figure 28

Figure 29

Notice the menu items change to TOOLS, LENG, etc., as shown in Figure 27. Press the LENG menu key and length units appear on the menu. Press ⟵ followed by the YD menu key and notice your length on Level 1 is changed to yards (see Figure 28). Press NXT to see more length units. Press NXT again and then ⟵ followed by the CHAIN menu key to convert from yards to chains. Press NXT two more times to wrap around once again to your first menu page and press ⟵ followed by the M menu key to convert back to meters (see Figure 29).

39. The 50g supports compound units as well, such as m/s. Many units are defined by combinations of other unit types. A well known example is the Newton, a measure of force. Press 1 ⟶ 6 NXT, the FORCE menu key, followed by the N menu key. 1 newton

is placed on the stack. Now press $\boxed{\text{NXT}}$, followed by the UNITS, TOOLS, and UBASE menu keys. The NEWTON is converted to 1 kg times meters divided by seconds squared, or $1 \ \dfrac{kg \times m}{s^2}$.

40. The 50g supports many other unit capabilities such as prefixes (giga, kilo, centi, micro, etc.) and is an invaluable tool for physics and engineering problems. Using the built-in unit tools, you can utilize units directly in your calculations and save yourself from time-consuming conversions. Press $\boxed{\rightarrow}$ followed by $\boxed{\leftarrow}$ (CLEAR) to clean off your stack before the next section. For more information about operations with units, see Chapter 3 of the *HP 50g Graphing Calculator User's Manual*, or the *HP 50g Graphing Calculator User's Guide*.

Memory Management

41. As we've worked, several variables have been created in the calculator's memory. Press VAR and a menu with items stored in your local memory appears. You will notice variables **C**, **B**, **A** and **EQ** are there. Press the C menu key and notice that your previous C variable appears on the stack (see Figure 30).

42. Press $\boxed{\text{ALPHA}}$ F3(C) then ENTER. The VALUE stored in **C** from the previous problem also appears (**3000._cm**). This is because by typing C alone, the 50g looks in your memory, discovers a variable stored there named, **C** and uses it.

43. Now press $\boxed{\ '\ }$ followed by the C menu key and press ENTER. Notice how this time the C is not automatically evaluated. Placing it inside tic marks (' ') has turned it into a variable name on the stack. Press 100 ENTER followed by RIGHT cursor (see Figure 32). Now press STO to store 100 into variable C. How are we sure it was stored? Press $\boxed{\ '\ }$, followed by $\boxed{\text{ALPHA}}$ then F3(C) to place 'C' on the stack. Press $\boxed{\leftarrow}$ followed by STO (RCL) to recall the variable named 'C'; the value **100.** appears on the stack.
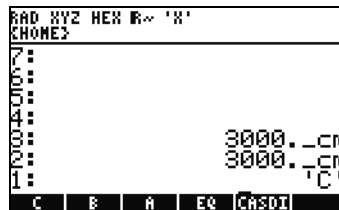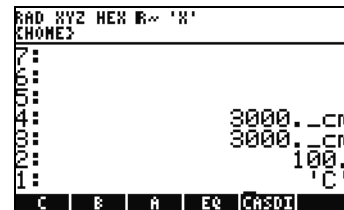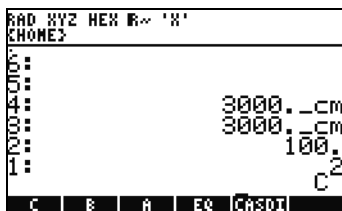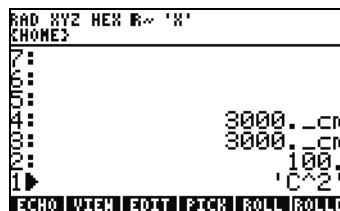
Figure 30

Figure 31

Figure 32

RAD XYZ HEX R~ 'X' {HOME}	RAD XYZ HEX R~ 'X' {HOME}	RAD XYZ HEX R~ 'X' {HOME}
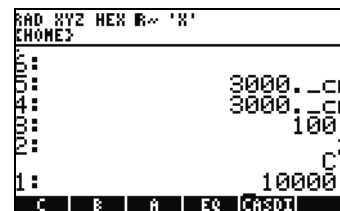
Figure 33   Figure 34   Figure 35

44. Now press ⟳ ' (EQW) to open the EquationWriter. This time, type ALPHA F3 (C) Yˣ 2 ENTER. C^2 appears on the stack (see Figure 33). This is an Algebraic object. Press the UP cursor and you will see **'C^2'** on the stack (see Figure 34). The EquationWriter automatically surrounded the equation with ticks. In short, to prevent automatic execution of a variable, equation, program or any other object, simply place it inside ticks. Press CANCEL to exit the interactive stack mode.

45. Now press ENTER to make a second copy of C^2. Press ⟳ followed by ENTER (->NUM) and the value of the variable C, 100, is used, returning a result of **10000.** (see Figure 35).

46. It can be tedious to type variable names every time. Since storing and using variables is essential for many complex calculations, a quicker way is desired. Press VAR to show your variables again. This time, press ⟳ followed by the C menu key. Just as if you typed 'C' and pressed RCL, the value is recalled. Type 2 then ÷ and **50** appears. To save the value back into C, press ⟵ followed by the C menu key. With C^2 on Level 1, (you may have to press ⬅ once) now press ⟳ ENTER (->NUM) to evaluate C^2. Since 50 was used, the result this time is **2500**. For more information on memory and memory management, see Chapter 26 of the *HP 50g Graphing Calculator User's Guide*.

Closely related to the numerical solver we just explored is the HP Equation Library. The equation library contains hundreds of sorted equations organized into categories. These equations have detailed information about the equations, including pictures and variable information. Using the equation library, you can numerically solve, with full unit support, series of related equations quickly by entering a few of the variables. Also included with the 50g is the HP Periodic Table of the Elements. The Periodic Table of the Elements displays a graphical version of The Periodic Table of the Elements and 23 different properties for each element, plots elements in relation to one another based

on those properties, and calculates molecular weights for chemical formulas.

These tools come installed on your calculator, and you are encouraged to explore them after you complete this quick start guide. To access these installed library programs, press APPS and scroll to the bottom of the list using the UP or DOWN cursor keys. If you do not see the Equation Library or The Periodic Table of the Elements in that list, it has been deleted from Port 2 of your calculator. Feel free to download and install it by visiting **www.hp.com/calculators**.

Graphing Functions

Let's now create a simple function and graph it. To begin, clear the stack by pressing ⟨➡⟩ followed by ⟨⬅⟩.

47. Above keys F1-F6 there are six labels printed in white used for plotting and graphing accessed by the ⟨↰⟩ key.

48. Remember in the last section how ⟨➡⟩-(variable) and ⟨↰⟩-(variable) recalls and stores. Because this key sequence performs the recall and store features, in order to access the labels used for plotting and graphing, you will need to press and hold the ⟨↰⟩ key, then press and hold the F1-F6 keys so both keys are pressed *simultaneously*. Now press and hold ⟨↰⟩ and simultaneously press and hold F4(2D/3D). Release the F4 key, then ⟨↰⟩.

49. The **Plot Setup** screen appears (see Figure 36). Press the CHOOS menu key and a list of plotting options appears (see Figure 37). Ensure that **Function** is selected and press ENTER. Now press and hold ⟨↰⟩ and simultaneously press and hold F1(Y=) to open the plot screen. Since the **Function** plot option was selected, the title of the page is, **PLOT-FUNCTION** (see Figure 38).
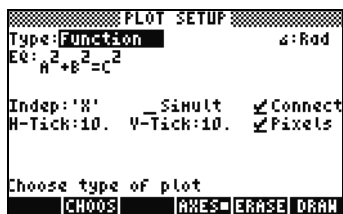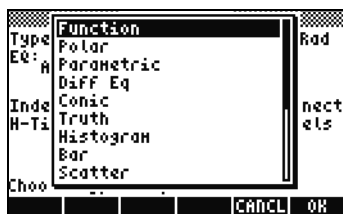

Figure 36

Figure 37

Figure 38

50. Notice that the function we used earlier in the Numeric Solver has appeared in both the **EQ:** field on the Plot Setup page and on the Plot-Function page. Since we don't want to plot that, press the DEL menu key to remove it. Now press the ADD menu key and

the EquationWriter appears with **Y1(X)=** (see Figure 39). Type 1 $\div$ 4 RIGHT cursor $\boxed{\times}$ $\boxed{\times}$ (the x key above the $\boxed{8}$ key) $\boxed{Y^x}$ 3 followed by RIGHT cursor twice $\boxed{-}$ $\boxed{\times}$ (x key) $\boxed{Y^x}$ 2 followed by RIGHT cursor twice then $\boxed{+}$ 1 ENTER. You

have now entered $Y1(x) = \frac{1}{4}x^3 - x^2 + 1$ (see Figure 40). Press and hold $\boxed{\leftarrow}$ and F2 (WIN) to open up an input form titled, **Plot**

Window to check the window size (see Figure 41). In here, you can change your default horizontal and vertical window settings. The default values should work fine, so press the ERASE menu key to remove any previous graphs, followed by the DRAW menu key. The 50g graphs the plot (see Figure 42).
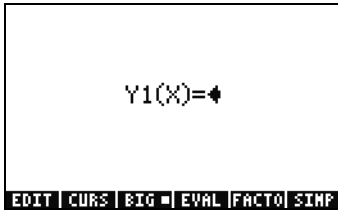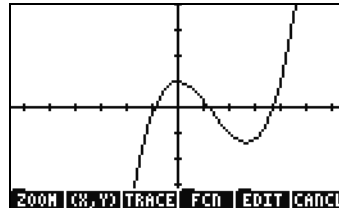

Figure 39

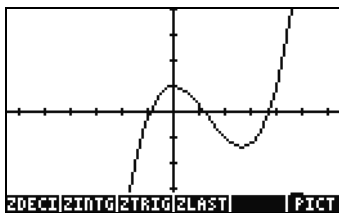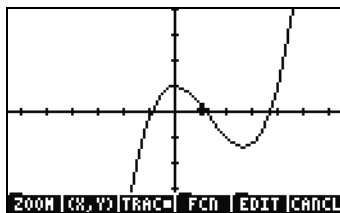

Figure 40

Figure 41

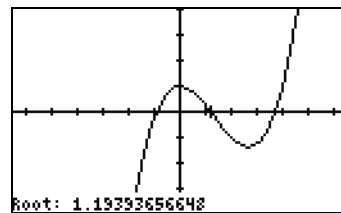Figure 42

Figure 43

Figure 44

Figure 45

51. Use the cursor keys to move along the axes. Press the ZOOM menu key to open a menu with zooming options. In here, you can zoom in and out, select a region using a box, and find many other options. Press (NXT) a few times to see more options. Feel free to try several zoom options. Use the ZDFLT menu key to return to the default zoom size. To leave the ZOOM menu, press (NXT) until you see the PICT menu key (see Figure 43). Press the PICT menu key to return to the main plot screen.

52. Once back to the main plot screen, press the TRACE menu key. A small white box to the right of the menu key indicates the tracer is active, and the cursor now traces along the function. Use the RIGHT and LEFT cursor keys to move (see Figure 44). Press the FCN menu key for options for finding roots, areas, intersections, and slope, among other options. Press the ROOT menu key to calculate the closest root (see Figure 45). Press the (NXT) key so the menu appears again, then (NXT) again to see more options. Here, press the F' menu key. The derivate of your function is performed, and then drawn on the screen along with the original function (see Figure 46).
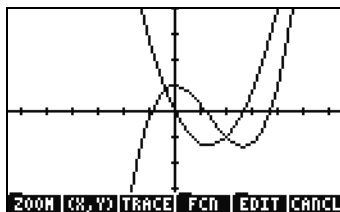

Figure 46

Now press CANCEL to exit the graph screen. Press and hold ⬅ and simultaneously press F1 to return to the plot screen (see Figure 47). Select the **.25 3. X^2-2x** function (the derivate) and press the DEL menu key. Now press and hold ⬅ and simultaneously press F6 to enter the table. You can easily see a table of your X and function values. Select an item in the X column and type 1.215. Press ENTER. The table jumps to that value and redisplays, as shown in Figure 49. For more information about graphing, see Chapter 10 of the *HP 50g Graphing Calculator User's Manual* or Chapters 12 and 22 of the *HP 50g Graphing Calculator User's Guide*.
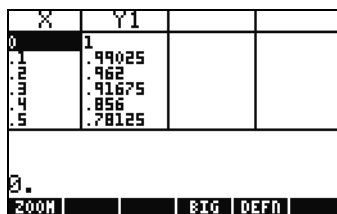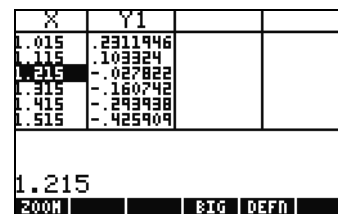

Figure 47

Figure 48

Figure 49

Advanced Memory Management

53. Go ahead and press CANCEL to exit the table view. Press VAR to access your menu variables. As you plot, a function named Y1 is automatically created to allow quick calculations with your function. Type -1.12 and press the Y1 menu key. The value is taken and the function calculated.

54. Press ⬅ followed by APPS (FILES) to open the Filer in order to examine your memory. HOME is where the objects used during calculations are stored. Libraries, programs that extend the functionality of your calculator, can be stored in port 0, Port1, or Port2. Port2 is the most secure, and libraries normally should be placed here.

55. Notice there is a tree under HOME showing **CASDIR**. With HOME selected, press the RIGHT cursor key to dive into that memory location. Use the UP and DOWN cursor keys to scroll through objects. You should see the objects that have been created during this quick start guide such as **A**, **B**, **C**, **EQ**, and so on. Notice the **CASDIR** folder is shown with a little folder icon. Other objects have different icons to represent what they are as well.

56. Next, let's create a folder to store and organize your previous equations and data. Press (NXT) and followed by the NEW menu key. Press DOWN cursor and then (ALPHA)(ALPHA) and type the letters for PYTHAG. Press ENTER.

57. Press (+/-) to check the **Directory** checkmark. Press the OK menu key to accept. A new directory titled, *PYTHAG* is created.

58. Use the DOWN cursor to highlight **B**. Press ENTER and notice a **1** is placed next to the left of the variable. Continue selecting **C** and **EQ** by using the cursor keys and pressing ENTER until they also are numbered. Now press (←) followed by (NXT) (PREV) to move through the previous menu rows. With COPY as an option, press the COPY menu key and the memory tree appears. Select the PYTHAG directory under HOME and press ENTER. Your objects are now copied to the directory.

59. Select the PYTHAG directory using the cursors and press RIGHT to dive into the folder. You should see the **A**, **B**, **C** , and **EQ** objects. Select **A** and press (NXT), followed by the PURGE and YES menu keys. **A** should be deleted. Press LEFT cursor to return out of that folder. Now select **B**, **C**, and **EQ** like before, and press the PURGE menu key again. This time press the ALL menu key to delete all the selected objects. Since you were planning to delete the objects instead of making copies of them, using the MOVE menu key would have accomplished this with one step.

60. Press CANCEL to exit the filer. Press VAR and notice there is a PYTHA folder on the menu. Press the PYTAH menu key, and your **B**, **C**, and **EQ** variables appear. Notice that there is no A variable. Press (→) followed by 7, and then press ENTER. Your previous **EQ** appears, along with **A**, **B** ,and **C**. Notice that even though there is no **A** in this folder, the 50g searches upwards in memory, discovers an **A** variable in the directory above, and uses it. This behavior can often surprise new users who get an unexpected answer when using the Computer Algebra System (CAS), because an old X variable is found.
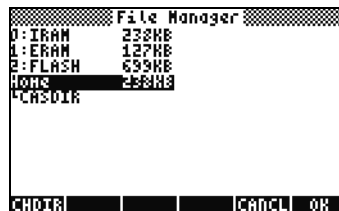

Figure 50   Figure 51   Figure 52

Using the Computer Algebra System (CAS) – Approximate versus Exact

The Computer Algebra System (CAS) on the 50g is extremely flexible and powerful. It can do everything from simple factorizations to advanced calculus. With a little experimentation, you'll quickly be able to calculate and solve a variety of problems. Throughout this guide, we've mentioned the Exact and Approximate modes used during calculations. When using the CAS, be aware of all of the calculator's current settings by glancing at the header. If you do not verify the settings before calculations, the 50g may not return expected results.

61. The most important of these settings is Exact/Approximate mode. To begin, toggle back to Exact mode by pressing and holding ⟶ and simultaneously pressing ENTER. **R=** in the header indicates Exact mode is the active setting.

62. Now type 100 and press ENTER. 100 appears on the stack (see Figure 53). Press ⟶ followed by SYMB (CAT) to access the command catalog. Press ⟶ followed by UP to jump to the top of the list and select the factorial command (**!**). Press ENTER. Shortly, a very large number appears (see Figure 54). Press UP followed by the VIEW menu key. Press and hold the RIGHT cursor key to scroll through the numbers. If you scroll to the end, you will have viewed all 158 digits in 100! Press CANCEL to exit to the interactive stack, and then CANCEL again.

63. Now type 100. (with a decimal point) followed by ENTER. The dot (.) indicates that this is a *real number*. Numbers such as 2.35 and 0.33333333334 are also real numbers. 2 and 100 without a dot, are called *integers* and are *exact* symbolic objects. Open the command catalog again, ⟶ followed by SYMB (CAT), and then press ENTER. This time, a result of **9.3326215..E157** is returned (see Figure 55). In other words, the full, exact precision was not used, but rather, a 12- digit decimal representation. Clear the stack by pressing ⟶ followed by ⟵ before moving on. For more information on CAS settings, see Chapter 1 of the *HP 50g Graphing Calculator User's Manual* or Chapter 1 or Appendix C of the *HP 50g Graphing Calculator User's Guide*.

Figure 53

Figure 54

Figure 55

Factoring and Solving

64. Another nice feature about RPN in Exact mode is you can build equations on the stack as you work. Press ⬚ X (x key) SPC 2 Y^x 9 ⬚ (see Figure 56). Notice as you type the equation is built step-by-step in the display.

65. Press ENTER to duplicate the equation before we begin experimenting.

66. Press ➔ followed by 4 (ALG) and then press the FACTO menu key. This factors the equation (see Figure 57). Press the EXPAN menu key to expand the equation back out. Now press DOWN cursor and the EquationWriter opens and is ready to edit your expression. Press DOWN cursor RIGHT cursor followed by +/- . The equation now reads $x^2 + 9$ (see Figure 58). Press ENTER to return to the stack.

Figure 56

Figure 57
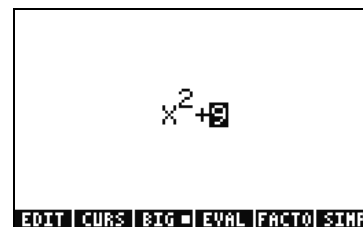
Figure 58

67. Press the FACTO menu key again. This time, nothing happens to the equation. This is because without using complex numbers, the equation can't be factored. Like the shortcut for the Exact/Approximate mode toggle, there is a Real/Complex toggle. Press and hold ⬚ and then press and hold TOOL (i) so both keys are pressed simultaneously. Release TOOl, then ⬚. In the header, note how the **R=** changes to **C=**, indicating that complex numbers are now being used (see Figure 59). Press the FACTO menu key again. This time, the equation is factored out with the result, $(x + 3i)(x - 3i)$ (see Figure 60). Press ⬅ to remove the equation. $x^2 - 9$ should still be on the stack.
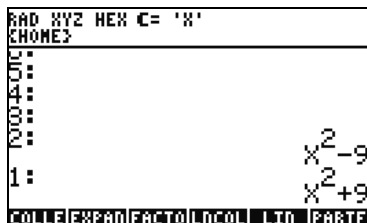
Figure 59

Figure 60

Figure 61

68. As you work with the CAS, it will automatically prompt you to change settings as needed. Sometimes a setting is active that can cause problems with later calculations. To return the CAS to its default state, press ⟶ followed by SYMB (CAT) ALPHA F3(C) DOWN cursor. With **CASCFG** selected (see Figure 61), press ENTER. This command resets the CAS to its default settings. Note how the header annunciator has changed from complex, **C=**, back to real, **R=**.

69. Now, let's solve for X. To begin, press ENTER to make a copy of your $x^2 - 9$. Press ⟨ ' ⟩ followed by ⟨ X ⟩ (x key) and press ENTER. Using 'X' instead of just X ensures that it remains a variable, and the calculator will not find and recall a number stored into X (see Figure 62). Press NXT to locate the SOLVE menu key and press it. The result, **{ X= -3 X= 3 }**, is returned (see Figure 63). Press ⟵ to delete the result. For more information, see Chapter 5 of the *HP 50g Graphing Calculator User's Manual* or Chapter 5 of the *HP 50g Graphing Calculator User's Guide*.

Figure 62

Figure 63

Simplification and Integration

70. Another characteristic of the 50g CAS is that it does not perform automatic simplification. It includes many commands that allow you to rewrite expressions in other equivalent representations. For example, you can rewrite TAN(X) into SIN(X)/COS(X) using the command TAN2SC (tangent to sin cosine). This allows you great flexibility in changing equations from one format into another.

71. Let's use $x^2 - 9$ from the previous example. Press ⟵ followed by 4 (CALC). Notice the commands, DERVX and INTVX on the menu (see Figure 64). The *VX* in the command name means that it will use your current default variable as the input. Up on the header, note the **'X'**. This means X is the current default variable.

72. Press the INTVX menu key four times. Watch as the symbolic integration proceeds. No simplification occurs as the command is run (see Figure 65). Now press → followed by 4 (ALG) to rewrite this expression. Press the EXPAN menu key expand all parts of the expression. The result is a single expression. Now press the COLLE menu key to collect like-terms together. Press the FACTO menu key and note how the factors are expanded out even further. Finally, press the PARTF menu key to split the expression into separate terms (see Figure 66). For more information, see Chapter 11 of the *HP 50g Graphing Calculator User's Manual* or Chapters 13 and 14 of the *HP 50g Graphing Calculator User's Guide*.

Figure 64
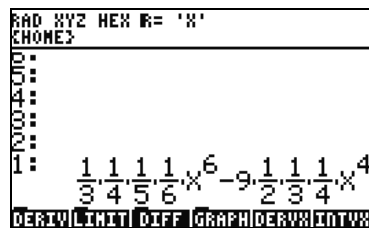
Figure 65

Figure 66

CAS Troubleshooting

The 50g CAS has an incredible selection of tools that allows you to solve and manipulate symbolic vectors, matrices, and polynomials. Again, as previously mentioned, this wide variety of tools and setting options means that sometimes results are returned in a form other than expected. For example, solving an integral may get a strange result, because the calculator is set in cylindrical coordinate mode,

and the answer is returned in cylindrical form. There are four main problems new users often encounter while using the CAS:

- First, the CAS settings have been changed to something incorrect. Use the command CASCFG to reset the CAS settings back to the defaults.
- Second, a variable is being found and used. Remember earlier when we saw how 'C' and C could behave differently? In a CAS calculation, variables can be replaced by numerical values if they are found in memory.
- Third, Approximate versus Exact mode. X^2. And X^2 are different because of the period after the number (2.) versus (2). If there are real numbers in an equation during a CAS command, the results generally will not be returned as expected.
- Fourth, the result is returned in a non-simplified, or a different form than expected. To solve this, the 50g allows the user to rewrite the equations using many different tools. This allows you to explore mathematical relationships between various functions and lets you decide on the desired form of the answer.

Troubleshooting and FAQs

The previous exercises and discussion were intended to familiarize you with some of the many functions available on the 50g. If you have additional questions, or if you require more in-depth information, there are a wide range of resources available at **www.hp.com/calculators**. More information may be found on the CD that came with your calculator, the HP manuals cited throughout the previous text, and learning tutorials available on the HP website, which will guide you through topics ranging from basic operation to advanced programming techniques.

In addition to these resources available on the HP Calculator website, **www.hp.com/calculators**, there is an HP-sponsored discussion group accessible on the *HP Calculators* page where you can ask questions, get answers, and share information with other users in an HP-sponsored Calculator Community. For more information, visit: **www.hp.com/calculators.** On the *HP Calculators* page, click on the **Calculator support forum** link under *Calculator Community*.

Table 1-1 Troubleshooting and FAQ's

| Common Problem/Question	Solution
Why is my function returning a wrong answer?	There may be an error in the function, but if everything appears correct, there is probably a number stored in one of your variables. This variable may be in your current directory or in a higher directory on your calculator. For example, if X^2 is evaluated while 0 is stored in variable X in a higher directory, the function becomes 0^2 and returns an unexpected result. To fix the problem, delete the variable. Refer to the section titled, *Memory Management* above.
Why is there a dot after my number?	In approximate mode, whole numbers have a decimal to distinguish them from exact integers. Refer to the previous sections titled, *Basic Math* and *Using the Computer Algebra System (CAS) - Approximate versus Exact*.
Why are my symbolic solutions different than I expect?	Please see the section titled, *CAS Troubleshooting* in this guide. Also, iff DERVX,INTVX, or SOLVEVX are not working properly, check that the independent variable name (MODE CAS) is X. There is a difference between X and x. The calculator is case sensitive.
How do I integrate functions?	Use the integration symbol for numeric integration and the command INTVX for symbolic integration.
Why does the solver only give me one answer to my polynomial?	The numeric solver uses an initial guess and finds the nearest solution. On polynomials and periodic functions like sine or cosine, changing the initial guess returns a different solution. Refer to the section titled, *Using Equation Solvers* in this guide for more information.
Why do I see choose boxes instead of soft menus?	The calculator offers both choose boxes and soft key menus. We recommend soft key menus. To turn these on press MODE, press the FLAGS menu key and set flag 117 to use Soft menus.
What is the symbol above my screen that won't go away?	This is usually the low battery warning message, but it also can be one of five other status annunciators. When the low battery annunciator appears, please change your AAA batteries. Refer to the sections titled, *The Keyboard, Menus, and Annunciators*, and *Replacing the Batteries* (below).

Table 1-1 Troubleshooting and FAQ's

Common Problem/Question	Solution
How do I transfer files from my computer to my calculator?	You can use a USB cable and the accompanying connectivity kit, however, you will probably find that using an SD card is the quickest and easiest way to transfer files. Everything you can do with the connectivity kit you can also do with an SD card. For more information, see Chapter 26 of the *HP 50g Graphing Calculator User's Guide*.
Why isn't my SD card working?	The calculator will accept any SD card smaller than 2GB. Anything larger is an SDHC card and will not function. FAT is the best format to use on your card, because FAT32 causes a two second delay each time you turn on your calculator. The filer may not display the full capacity on your SD card if it is larger than 1GB, but you can still use the full space available even if it is not displayed.
Why can't I transfer folders between my calculator and my computer?	Your calculator's method of handling folders differs from the way your computer handles folders. You cannot copy folders from the computer directly into your calculator, or folders in your calculator directly into your computer. Instead, transfer individual files.
Why can't I delete folders on my SD card using my calculator?	The calculator can access and save files in any location on the SD card, but it does not copy files between folders or delete folders on the SD card. Use your computer to manage files on your SD card.
How do I install software?	There are two main program types - libraries and programs. A program is usually a single object that performs a single function. These are placed in your HOME directory and run using a menu key. A library is a collection of many programs that integrates into your computer like a native function. Using the filer, place libraries in port 0, 1, or 2. Port 2 is usually the best option. Refer to the section titled, *Advanced Memory Management* above. Once installed, reboot the calculator by pressing and holding ON and simultaneously pressing the F3 key. Release the F3 key, followed by ON. To access library functions, press 🠒 2(LIB). All functions in a library will also appear in the command catalog accessed by pressing 🠒 SYMB (CAT). Please see the program documentation for more information.

Table 1-1 Troubleshooting and FAQ's

Common Problem/Question	Solution
Which programs can I install on my calculator?	Please see the program documentation for more information. If the program is written for the 49G, 48GII 49G+ or 50G, it will probably run on your calculator. Although some 48g programs will run, the majority will not.
Where can I find a list of every command in the calculator?	The *HP 50g/49g+/48gII Advanced User's Reference*, available at **www.hp.com/calculators**, contains an extensive list of every command and other usage information. In addition, it contains advanced programming techniques, lists of possible error messages, usage information for the HP equation library, and other topics. You may also look on the accompanying CD for more learning modules and information.
Where can I get help with other problems with my calculator?	The quickest way is usually to visit our support forum. Visit: **www.hp.com/calculators** and click on the *Calculator support forum* link under *Calculator Community*.

Basic Features, Customizing the Calculator, and Setting the Internal Clock

The following section provides you with additional information about the basic features of the calculator. Many of the concepts of this section were introduced in the sections above while working through the example problems and are explained in more detail here. This is provided as an overview, and the pages of the *HP 50g Graphing Calculator User's Guide* and the *HP 50g Graphing Calculator User's Guide* are included for reference. You are encouraged to consult these pages of the user's guide for more information and detailed descriptions. For useful key shortcuts for some of the tasks listed below, also refer to Appendix G of the *HP 50g Graphing Calculator User's Guide*.

Table 1-2 Basic Features, Customizing the Calculator, and Setting the Internal Clock

Functions	Display/Description
Turn calculator on/off	To turn calculator on, press ON. Note ON is printed on the key. The calculator turns off automatically 10 minutes after it was last used. To turn off, press ⟦→⟧ ON. Note **OFF** is printed above the key to the right. For more information, see Chapter 1 of the *HP 50g Graphing Calculator User's Manual* or the *HP 50g Graphing Calculator User's Guide*.
Display contrast	To change the display contrast, press and hold ON followed by ⟦+⟧ or ⟦−⟧. Each press of ⟦+⟧ increases the contrast slightly; each press of ⟦−⟧ decreases the contrast slightly. For more information, see Chapter 1 of the *HP 50g Graphing Calculator User's Manual* or the *HP 50g Graphing Calculator User's Guide*.
Cancel or escape	Press the ON key (CANCL) when the calculator is powered up. Press ⟦→⟧ followed by the by the backspace key ⟦⬅⟧ (CLEAR) to clear the history (stack).
Return to the HOME screen	To return to the **{HOME}** screen from within another menu, press the ⟦TOOL⟧ key. For more information, see Chapter 1 of the *HP 50g Graphing Calculator User's Manual* or the *HP 50g Graphing Calculator User's Guide*.
Deleting an entry	Use the backspace key to edit your entries. Each press of the backspace key deletes characters to the left of the cursor, one character at a time. Press ⟦↰⟧ followed by ⟦⬅⟧ (DELETE) to delete highlighted entries on the entry line, or in the EquationWriter. Within a highlighted area, the ⟦↰⟧ DEL key command deletes the latest entry, much like the backspace key. For more information, see Chapter 2 of the *HP 50g Graphing Calculator User's Manual* or Chapter 2 of the *HP 50g Graphing Calculator User's Guide*.
Clearing the history or the stack	Press ⟦→⟧ followed ⟦⬅⟧ (CLEAR) to clear the history, or the stack, if in RPN mode. When used with the cursor keys to highlight portions of expressions or equations, it also deletes highlighted entries in the EquationWriter. For more information, see Chapter 2 of the *HP 50g Graphing Calculator User's Manual* or the *HP 50g Graphing Calculator User's Guide*.

Table 1-2 Basic Features, Customizing the Calculator, and Setting the Internal Clock

| Functions	Display/Description
Entering letters with the (ALPHA) key	You can store and retrieve numerical data in the variables A through Z. But first, you have to know how to enter letters of the alphabet. These letters appear near the bottom right corner of most of the keys on the keyboard, and are accessed by pressing the (ALPHA) shift key first. When pressed, the Alpha annunciator appears in the display. For example, press (ALPHA) followed by the F1 key to enter the letter A. You do not need to hold down the (ALPHA) shift key - just press and release it. You may also enter upper case or lower case letters. For lower case letters, press (ALPHA) one time, followed (←) then the desired letter. For upper case, press the (ALPHA) key two times followed by the desired letter. For more information, see Chapter 2 of the *HP 50g Graphing Calculator User's Manual* or the *HP 50g Graphing Calculator User's Guide*.
Selecting Soft menu keys or CHOOSE boxes (Calculator Modes menu)	1. To select Soft menu keys (keys below the display) or Choose boxes, press (MODE) to open the Calculator Modes input form. 2. The default setting is Choose boxes. When Choose boxes are active, the CHOOS menu key appears as a label within a menu. Press the CHOOS menu key to see the options within the fields in a menu. 3. To change the format in which menus are displayed, press the FLAGS menu key. **System Flags** is displayed at the top of the screen. Note: a *flag* is a Boolean value, that can be set or cleared (true or false), that specifies a given setting of the calculator or an option in a program. Flags in the calculator are identified by numbers. A flag is set if you see a check mark in front of the flag number. Use the UP cursor key to highlight number **117**. 4. Press CHK to toggle between **CHOOSE boxes** and **Soft menu**. *Soft menu* refers to using the function keys (F1-F6) to see available options in a menu. 5. With Soft MENU displayed, press OK twice to return to the normal calculator display. 6. To see an example of the available labels of a menu using only soft keys (the six keys below the display), press (→) (3). Press (NXT) to see all available functions of the Base menu. 7. Press (MODE) to return to the Calculator Modes menu and continue viewing/changing the settings. For more information, see Chapter 1 of the *HP 50g Graphing Calculator User's Manual* or Chapter 2 of the *HP 50g Graphing Calculator User's Guide*.

Table 1-2 Basic Features, Customizing the Calculator, and Setting the Internal Clock

| Functions	Display/Description
Customize the number display, change mode settings, open the CAS Modes input form.	1. Use the Modes input form to set the modes and customize the number display for the Home view. Press the (MODE) key to open the Calculator Modes input page. Press (NXT) to see the second page of the menu. 2. Use the cursor keys to move around the page. 3. With a field highlighted, press (+/–) to view the available options. The displayed setting is the active setting. 4. Use the CHK menu key to select/deselect items with a check mark. Checked items are active. 5. Press (NXT) until the CAS menu key appears. Press it to access the **CAS MODE** input page. Press the OK menu key or ENTER to save settings and return to the **Calculator Modes** page. 6. Press the OK menu key once again to return to the **{HOME}** view. For more information, see Chapter 1 of the *HP 50g Graphing Calculator User's Manual* or the *HP 50g Graphing Calculator User's Guide*.
Resetting the Calculator	If the calculator locks up and seems to be stuck, you can reset it using a keyboard reset. Resetting cancels certain operations, restores certain conditions, and clears the temporary memory locations. It does not erase stored data, such as variables and programs. To reset: 1. Press and hold the ON key and the third menu key from the left, F3, simultaneously for a second or two, then release the F3 key first, followed by the ON key. If you are using an emulator, right-click the ON key to hold the shift command and left-click the F3 key. Release the F3 key first by left-clicking, followed by the ON key. To erase all memory and reset defaults. NOTE: this action erases everything you have stored and returns the calculator to its default settings: 1. Press and hold the ON key, the first menu key (F1), and the last menu key (F6) simultaneously for a second or two, then release them one at a time, starting with the F6 key. If using the emulator, perform right-clicks on all the keys to hold them simultaneously. Right-click to release them. 2. If the calculator still does not turn on, try inserting the end of a straightened paper clip into the small hole on the back of the calculator. Press gently for one second, then release. Press the ON key.

Table 1-2 Basic Features, Customizing the Calculator, and Setting the Internal Clock

Functions	Display/Description
Setting time and date	1. To change the time and date, press ⬚➔ followed by ⬚9 (TIME).
	2. Using the cursor keys, highlight **Set time, date...,** or press ⬚3. Note: you may also set and browse alarms, and use Time tools from this menu. For a complete list of Time tools, see Chapter 25 of the *HP 50g Graphing Calculator User's Guide.*
	3. Press the OK menu key.
	4. Using the keyboard, key in number(s) for the current hour followed by ENTER.
	5. With the last field to the right highlighted, press the ⬚+/– to scroll through options for AM, PM, or 24-hour clock. The option displayed option will become the active setting. Press the DOWN cursor key to highlight date format.
	6. With the field highlighted, press ⬚+/– to select either **M/D/Y** (month-day-year) or **D.M.Y** (day-month-year) formats. The displayed option will become the active setting.
	7. Using the cursor keys, highlight the fields for day, month, and year.
	8. Key in the numbers, followed by ENTER.
	9. Once you have set the date and time fields, press the OK menu key or ENTER to exit the menu and save your settings, or CANCL to cancel. For more information, see Chapter 1 of the *HP 50g Graphing Calculator User's Manual* or the *HP 50g Graphing Calculator User's Guide.*

Replacing the Batteries

The HP 50g calculator takes 4 AAA (LR03) batteries as a main power source and one CR2032 lithium battery for memory backup. If the low battery symbol appears on the display of the HP 50g calculator, replace the batteries as soon as possible. However, to avoid loss of data, remove the backup battery and main batteries at the same time. Have the new batteries readily at hand before opening the battery compartment. Once the batteries are removed, replace them within two minutes to avoid losing stored information.

To install the main batteries:
1.   Turn off the calculator.
2.   Slide up the battery compartment cover.
3.   Remove the old batteries.
4.   Insert 4 new AAA (LR03) batteries into the main compartment.
5.   Make sure each battery is inserted in the indicated direction.

Follow these steps to install the new backup battery:
1.   Turn off the calculator.
2.   Remove the back cover of the battery compartment. The lithium battery is located underneath the small square cover located above the AAA batteries.
3.   Carefully remove the cover by sliding the tabs forward to align with the slots and gently lift the cover off.
4.   Remove the old battery.
5.   Insert a new CR2032 lithium battery with its positive polarity facing up.
6.   Replace the back cover of the backup battery.
7.   Replace the cover to the battery compartment.
8.   Press ON to turn on the calculator.

Warranty and Contact Information

Warning! There is danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions. Do not mutilate, puncture, or dispose of batteries in fire. The batteries can burst or explode, releasing hazardous chemicals.

HP Limited Hardware Warranty and Customer Care
This HP Limited Warranty gives you, the end-user customer, express limited warranty rights from HP, the manufacturer. Please refer to HP's web site for an extensive description of your limited warranty entitlements. In addition, you may also have other legal rights under applicable local law or special written agreement with HP.

Limited Hardware Warranty Period
Duration: 12 months total (may vary by region, please visit **www.hp.com/support** for latest information).

General Terms

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TO THE EXTENT ALLOWED BY LOCAL LAW, THE REMEDIES IN THIS WARRANTY STATEMENT ARE YOUR SOLE AND EXCLUSIVE REMEDIES. EXCEPT AS INDICATED ABOVE, IN NO EVENT WILL HP OR ITS SUPPLIERS BE LIABLE FOR LOSS OF DATA OR FOR DIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFIT OR DATA), OR OTHER DAMAGE, WHETHER BASED IN CONTRACT, TORT, OR OTHERWISE. Some countries, States or provinces do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

FOR CONSUMER TRANSACTIONS IN AUSTRALIA AND NEW ZEALAND: THE WARRANTY TERMS CONTAINED IN THIS STATEMENT, EXCEPT TO THE EXTENT LAWFULLY PERMITTED, DO NOT EXCLUDE, RESTRICT OR MODIFY AND ARE IN ADDITION TO THE MANDATORY STATUTORY RIGHTS APPLICABLE TO THE SALE OF THIS PRODUCT TO YOU.

Notwithstanding the above disclaimers, HP expressly warrants to you, the end-user customer, that HP hardware, accessories and supplies will be free from defects in materials and workmanship after the date of purchase, for the period specified above. If HP receives notice of such defects during the warranty period, HP will, at its option, either repair or replace products which prove to be defective. Replacement products may be either new or like-new.

HP also expressly warrants to you that HP software will not fail to execute its programming instructions after the date of purchase, for the period specified above, due to defects in material and workmanship when properly installed and used. If HP receives notice of such defects during the warranty period, HP will replace software media which does not execute its programming instructions due to such defects.

Exclusions

HP does not warrant that the operation of HP products will be uninterrupted or error free. If HP is unable, within a reasonable time, to repair or replace any product to a condition as warranted, you will be entitled to a refund of the purchase price upon prompt return of the product with proof of purchase.

HP products may contain remanufactured parts equivalent to new in performance or may have been subject to incidental use.

Warranty does not apply to defects resulting from (a) improper or inadequate maintenance or calibration, (b) software, interfacing, parts or supplies not supplied by HP, (c) unauthorized modification or misuse, (d) operation outside of the published environmental specifications for the product, or (e) improper site preparation or maintenance.

Customer Care

In addition to the one year hardware warranty your HP calculator also comes with one year of technical support. If you need assistance, HP customer care can be reached by either email or telephone. Before calling please locate the call center nearest you from the list below. Have your proof of purchase and calculator serial number ready when you call.

Telephone numbers are subject to change, and local and national telephone rates may apply. For more support information, please visit the web at: **www.hp.com/support**.

Table 1-3 Customer Care Information

Country	Hotline Phone	Country	Hotline Phone	Country	Hotline Phone	Country	Hotline Phone
Algeria	www.hp.com/support	Anguila	1-800-711-2884	Antigua	1-800-711-2884	Argentina	0-800-555-5000
Aruba	800-8000 ; 800-711-2884	Australia	1300-551-664	Austria	01 360 277 1203	Bahamas	1-800-711-2884
Barbados	1-800-711-2884	Belgium (English)	02 620 00 86	Belgium (French)	02 620 00 85	Bermuda	1-800-711-2884
Bolivia	800-100-193	Botswana	www.hp.com/support	Brazil	0-800-709-7751	British Virgin Islands	1-800-711-2884
Bulgaria	www.hp.com/support	Canada	800-HP-INVENT	Cayman Island	1-800-711-2884	Chile	800-360-999
China	800-820-9669	Columbia	01-8000-51-4746-8368 (01-8000-51-HP INVENT)	Costa Rica	0-800-011-0524	Croatia	www.hp.com/support
Curacao	001-800-872-2881 + 800-711-2884	Czech Republic	296 335 612	Denmark	82 33 28 44	Dominica	1-800-711-2884
Dominican Republic	1-800-711-2884	Egypt	www.hp.com/support	El Salvador	800-6160	Equador	1-999-119 ; 800-711-2884 (Andinatel) 1-800-225-528; 800-711-2884 (Pacifitel)
Estonia	www.hp.com/support	Finland	09 8171 0281	France	01 4993 9006	French Antilles	0-800-990-011; 800-711-2884
French Guiana	0-800-990-011; 800-711-2884	Germany Deutschland	069 9530 7103	Ghana	www.hp.com/support	Greece	210 969 6421
Grenada	1-800-711-2884	Guadelupe	0-800-990-011; 800-711-2884	Guatemala	1-800-999-5105	Guyana	159 ; 800-711-2884

Table 1-3 Customer Care Information

Country	Hotline Phone	Country	Hotline Phone	Country	Hotline Phone	Country	Hotline Phone
Haiti	183 ; 800-711-2884	Honduras	800-0-123 ; 800-711-2884	Hong Kong	800-933011	Hungary	www.hp.com/ support
India	1-800-114772	Indonesia	(21)350-3408	Ireland	01 605 0356	Italy	02 754 19 782
Jamaica	1-800-711-2884	Japan	00531-86-0011	Kazakhstan	www.hp.com/ support	Latvia	www.hp.com/ support
Lebanon	www.hp.com/ support	Lithuania	www.hp.com/ support	Luxembourg	2730 2146	Malaysia	1800-88-8588
Martinica	0-800-990-011; 877-219-8671	Mauritius	www.hp.com/ support	Mexico	01-800-474-68368 (800 HP INVENT)	Montenegro	www.hp.com/ support
Montserrat	1-800-711-2884	Morocco	www.hp.com/ support	Namibia	www.hp.com/ support	Netherlands	020 654 5301
Netherland Antilles	001-800-872-2881 ; 800-711-2884	New Zealand	0800-551-664	Nicaragua	1-800-0164; 800-711-2884	Norway	23500027
Panama	001-800-711-2884	Paraguay	(009) 800-541-0006	Peru	0-800-10111	Philippines	(2)-867-3351
Poland	www.hp.com/ support	Portugal	021 318 0093	Puerto Rico	1-877 232 0589	Romania	www.hp.com/ support
Russia	495-228-3050	Saudi Arabia	www.hp.com/ support	Serbia	www.hp.com/ support	Singapore	6272-5300
Slovakia	www.hp.com/ support	South Africa	0800980410	South Korea	00798-862-0305	Spain España	913753382
St Kitts & Nevis	1-800-711-2884	St Lucia	1-800-478-4602	St Marteen	1-800-711-2884	St Vincent	01-800-711-2884
Suriname	156 ; 800-711-2884	Swaziland	www.hp.com/ support	Sweden	08 5199 2065	Switzerland	022 827 8780

Table 1-3 Customer Care Information

Country	Hotline Phone	Country	Hotline Phone	Country	Hotline Phone	Country	Hotline Phone
Switzerland	01 439 5358	Switzerland (Italian)	022 567 5308	Switzerland (French)	022 827 8780	Taiwan	00801-86-1047
Thailand	(2)-353-9000	Trinidad & Tobago	1-800-711-2884	Tunisia	www.hp.com/ support	Turkey	www.hp.com/ support
Turks & Caicos	01-800-711-2884	UAE	www.hp.com/ support	United Kingdom	0207 458 0161	Uruguay	0004-054-177
US Virgin Islands	1-800-711-2884	USA	800-HP INVENT	Venezuela	0-800-474-68368 (0-800 HP INVENT)	Vietnam	+65-6272-5300
Zambia	www.hp.com/ support						

Product Regulatory & Environment Information

Federal Communications Commission Notice

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or television technician for help.

Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Hewlett-Packard Company may void the user's authority to operate the equipment.

Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods to maintain compliance with FCC rules and regulations. Applicable only for products with connectivity to PC/laptop.

Declaration of Conformity for products Marked with FCC Logo, United States Only

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

If you have questions about the product that are not related to this declaration, write to:
Hewlett-Packard Company
P.O. Box 692000, Mail Stop 530113
Houston, TX 77269-2000

For questions regarding this FCC declaration, write to:
Hewlett-Packard Company
P.O. Box 692000, Mail Stop 510101
Houston, TX 77269-2000
or call HP at 281-514-3333

To identify your product, refer to the part, series, or model number located on the product.

Canadian Notice

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Avis Canadien

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

European Union Regulatory Notice

This product complies with the following EU Directives:

- Low Voltage Directive 2006/95/EC
- EMC Directive 2004/108/EC

Compliance with these directives implies conformity to applicable harmonized European standards (European Norms) which are listed on the EU Declaration of Conformity issued by Hewlett-Packard for this product or product family.

This compliance is indicated by the following conformity marking placed on the product:

$C\epsilon$ | $C\epsilon$ xxxx· ⓘ

This marking is valid for non-Telecom products and EU harmonized Telecom products (e.g. Bluetooth).
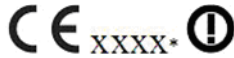
This marking is valid for EU non-harmonized Telecom products. *Notified body number (used only if applicable-refer to the product label).

Hewlett-Packard GmbH, HQ-TRE, Herrenberger Strasse 140, 71034 Boeblingen, Germany

The official EU CE declaration of conformity for this device may be found at **http://www.hp.com/go/certificates**.

Japanese Notice

この装置は，クラスB情報技術装置です。この装置は，家庭環境で使用することを目的としていますが，この装置がラジオやテレビジョン受信機に近接して使用されると，受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。　　　　ＶＣＣＩ－Ｂ

Korean Class Notice (Applicable only for products with connectivity to PC/laptop).

B급 기기 (가정용 방송통신기기)	이 기기는 가정용(B급)으로 전자파적합등록을 한 기기로서 주로 가정에서 사용하는 것을 목적으로 하며, 모든 지역에서 사용할 수 있습니다.

Disposal of Waste Equipment by Users in Private Household in the European Union

This symbol on the product or on its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

Chemical Substances

HP is committed to providing our customers with information about the chemical substances in our products as needed to comply with legal requirements such as REACH (*Regulation EC No 1907/2006 of the European Parliament and the Council*). A chemical information report for this product can be found at:

http://www.hp.com/go/reach

Perchlorate Material - special handling may apply

This calculator's Memory Backup battery may contain perchlorate and may require special handling when recycled or disposed in California.

产品中有毒有害物质或元素的名称及含量
根据中国《电子信息产品污染控制管理办法》

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
PCA	X	O	O	O	O	O
外壳录 /字键	O	O	O	O	O	O

O：表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/T 11363-2006 标准规定的限量要求以下。

X：表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T 11363-2006 标准规定的限量要求。

表中标有"X" 的所有部件都符合欧盟RoHS法规

"欧洲议会和欧盟理事会2003年1月27日关于电子电器设备中限制使用某些有害物质的2002/95/EC 号指令"

注：环保使用期限的参考标识取决于产品正常工作的温度和温度等条件