20 Essential Things to Know About the HP-49G:

A guide for the hopelessly confused

Congratulations on the purchase of your new best friend! OK. It probably isn't your best friend right now, but it can be if you give it a chance. Like most relationships (especially with the opposite sexc), this one can start out a little rough. ;-)

The HP-49 has a sharper learning curve than other calculators. The lack of very good documentation is a large problem in this area. Once you get over the sharp climb at the beginning, everything starts to make sense and you begin to realize how great this calculator really is. One of the greatest things about the calculator is that it has so many capabilities. Having owned one for over 2 years, I still have not used most of the functions built into the calculator, so each day is a journey into the unknown.

This document is written to help out with the new owner, to teach you all the things that made us old users think, "Hey! I wish I'd known that a long time ago. I can't live without it!" It isn't intended to be a replacement manual, but rather a guide to many common problems plaguing new users. In addition, it will have many tips and tricks that make operating the calculator easier and a lot more fun.

Just as a side note, this document will be called "20 essential things to know. . ." as long as it is still around. While there may be less than or more than 20 things eventually, I think "20 things" sounds nice. I'll leave it like that, even if there eventually get to be a thousand and one things. . . =)

Anyway, here we go…

1)RPN

The 49 has the option of using both algebraic and RPN mode. A new user might be wondering what RPN is, why it is still around, and why they should bother learning to use it? This section will help answer that.

RPN is basically algebraic mode in reverse. It is kind of like the way Yoda speaks in star wars - backwards. So in algebraic mode, I'd type 1 + 1 ENTER to add the numbers and get 3 (hey, it's new math ;-). In RPN it would be 1 1 + with no enter. RPN evaluates commands when they are entered, instead of after pushing ENTER. RPN uses a stack to store objects and data.

RPN is still used because it is much more efficient at entering data than in algebraic mode. In addition, it emulates how computer chips work (which is take two things and do something to them). Most of the people who use RPN will not use algebraic mode because it is much to slow and sloppy. It also saves keystrokes.

RPN does not use parenthe(()()(()'s, so there is no way to screw up the problem by having one in the wrong place. It also allows you to watch an equation getting built right on the stack. In RPN, you can enter a long list of objects at once without pushing enter. To enter a string of numbers, all that is necessary is to put say, 2 SPACE 3 SPACE 4 SPACE 6 ENTER, on one line and then all 4 will be put onto the stack.

Using RPN/algebraic is a personal preference. The majority of people who spend thirty minutes learning it however, don't like to use algebraic mode anymore. In addition, the 49 is really set up to use RPN better than algebraic. That is why the comma is a second function instead of a first function. RPN doesn't use commas.

Basically if you sit down and use it for an hour or so, everything will start to make a lot more sense with the calculator. Since you bought the calculator with RPN capability, you should spend a little

time learning it, even if you do eventually decide to use Algebraic mode instead. It will make things easier in the long run.

2) ROM's

A common question with the 49 is which ROM version should be used? The two main ROM versions at the writing of this document is 1.18, which is supported, and 1.19-6, which is an unsupported beta. Beta tends to imply unstable and dangerous to use in many people's minds, when in reality it means that it is still being tested. HP hasn't supported many versions of the ROM's, but they are stable and have many advances and bug fixes over earlier "safe" versions. This might be because if they supported the new ones, they'd have to write new manuals that include the many new commands and improvements.

1.19-5 had been used for about a year now, and has been well proven to be more stable than earlier versions, and has many improvements. Since 1.19-6 has been available, it seems to be even more stable than 1.19-5 and has many improvements. The answer to this question about ROM's is ALWAYS use the most recent version.

Here is a site besides HP's main site for getting the ROM. It also includes instructions for upgrading. If you are upgrading from a version BEFORE 1.19-5, follow the directions exactly as it is a little bit different. Here is the site address: http://www.epita.fr/~avenar_j/hp/49.html

3) HELP! My calculator is messed up and says "invalid card data"!

This can happen. Whenever there is any memory problem with the 49G, first try executing the PINIT command. This usually fixes it. If there are strange things appearing in the FILER, and you delete them but the come back the next time you look, try PINIT. If it doesn't work, execute it many times as sometimes it will work the third (or fourth or fifth ;-) time. Remember this command!!!!!!

4) HELP! My calculator is showing many strange things whenever I enter anything!

Some new users stumble over something that blows their mind out of the water. All of a sudden, the calculator stars adding things to everything they type in. They put in an X, and on the stack it shows up as ID X. A program suddenly appears with a lot of 'x', ::, and ; in it. ACK!

Do not fear. Your calculator isn't going crazy, it is doing what you accidentally told it to do. There is a feature in the 49 called a "sysRPL" stack. This means that objects are shown how they are encoded in the calculator's memory. This is VERY usefull for advanced programmers, as it allows us to see details of programs much easier.

To fix this, simply clear system flag –85. This restores what is aptly called "normal stack display". I guess us advanced people just ain't normal anymore. . . ;-)

5) Why do I get a dot after each number I enter?

There are two different kinds of numbers on the 49. One is called a real, and one is called an integer. Reals are approximate numbers, while integers are exact. Think of integers as symbolic values like an X or a Y. This means if you put two integers on the stack, say 1 and 3, and then divide them, the result will be 1/3. If you do this with reals, the result is .3333333333….

Integers are created when you are in approximate mode. They have no dot after them, while reals are distinguished with a dot. If there is a little squiggly line like this ~ (a tilde) up at the top, you are in

approximate mode. If it is an equal symbol (=), you are in exact mode. You use integers to do exact calculations with the CAS. Reals are used for regular number crunching. For a quick may to move between real and approximate mode, look at the shortcuts section below.

6) Key Shortcuts

There are several built-in shortcuts on the keyboard to make changing several common things possible without using the MODES menu. All of these assume that you are using 1.19-5 or higher. If you are not, update it after reading the previous section.

- R-shift HOLD Enter changes between exact and approximate mode.
- Down opens appropriate editor for item on level one of the stack or history
- Right swaps items on level one (RPN only)
- Up accesses stack or history. Similar to HIST button
- Left starts picture view to look at last graph or picture
- R-shift Down Displays full names of items in soft menu
- R-shift Right X-modem server mode
- R-shift HOLD Right Kermit server mode
- L-shift TOOL toggles real/complex mode
- R-shift Function keys Recalls object
- L-shift Function keys Stores object (RPN only)
- L-shift HOLD PREV Jumps to the last menu you were in. (So if you go from the PRG menu into the MTH menu, this will jump back to the PRG menu)
- L-shift HOLD UPDIR Goes back to home, no matter how far down in a directory you are

Another helpful thing to know is that by pushing MODE +/- ENTER in quick succession toggles between Algebraic/RPN mode. While not a true shortcut, it does go fast. Using +/- in any choose or check box in an inform menu (like the one seen in MODE) will change the item without using the softkey CHK button at all.

LEARN THESE SHORTCUTS! It will make life a lot easier. (did I mention you should learn these shortcuts. . .)

7) What is that STARTUP variable that appears in my home directory?

This is a small program that is created to be run on every warm-starts. It configures libraries and settings. You can add your own things you desire to be run into this program.

You can also have a program that is run every time the text editor is run. This allows to replace the editor with another of your choice, or to customize it in some other way. If I save a program like this << 0. ->HEADER >> and save it as STARTED, the header will be removed when I type text. This gives a lot more viewable area on the screen. Using << 2. ->Header >> saved as EXITED will restore the header with a size of 2.

8) Why is the calculator so slow at getting my keyclicks or it misses quick double presses?

The 49 stores a value that represents how long it takes before evaluating a key. This is to prevent accidental double presses of keys. The regular value is too high for most people. To change it, put a number like 300 into the command ->KEYTIME (~4000=1 sec). So to set my ketime at 300, I'd type 300 ->KEYTIME and push enter.

Too low can cause it to get double presses accidentally; too high and it waits too long to evaluate keypresses. Feel free to change this value to find something that is comfortable for you. I have mine set at

150. This will speed up everything in the calculator. Moving between menus and doing simple calculations will speed up to where you don't notice a wait while moving between them or evaluating.

9) What are the different kinds of menus and which should I use?

The two types of menus are Choose menus (the pop up boxes) and soft menus (boxes on the bottom of the screen like as in the HP-48). These are changed by setting or clearing system flag 117. System flags are in the FLAGS menu in the MODE button. They control things in the system. User flags are used in programs to control what happens in only that program. System flags are distinguished between user flags with a negative symbol. For more information about flags, look at this file which details every system flag in the calculator. http://www.hpcalc.org/details.php?id=4884

Each different kind of menu has its advantages and disadvantages. Choose boxes are much easier for new users. It seems much more natural to scroll through a list of choices then to find the command in a little box on the bottom of the screen. They also show the complete command name whereas soft menus show only five letters.

Soft menus are much faster when learned than choose menus. Choose menus are slower loading than soft menus additionally. A user who has used soft menus will be able to access commands faster than a user using choose menus every time. In addition, some things like unit conversions work much better when using soft menus in RPN.

Try both of these options out. Most users eventually switch to the soft menus because they prefer quicker command access. In addition, the menus shown in the pocket guide will only make sense in soft-menu mode.

10) Library management

Libraries are programs that are installed into port memory, and then are merged into the system on startup (ON-F3) Once installed, they are accessible through R-shift 2. The commands in libraries are essentially "built-in" after they are installed. This means the commands show up in the CAT and can be run by just typing them in.

One way to install them is to move the library into port 0,1 or 2 using the FILER. Another way is to recall the library, put the number of the port (0,1,2) on level one, and pushing STO. That is how its done in RPN. Algebraic mode, like usual, requires you to enter more things. You have to recall the library and then push STO :2: library_name.

Sometimes the libraries aren't in the order you'd like in the menu. They can also be slow in loading when you enter through the LIB key. A small application called Libman can help solve this problem. It saves a copy of the library menu and allows you to order it to your liking. In addition, it accesses the libraries quicker because a copy of the menu is saved.

11) Plotting

Plotting on the 49G is often much slower than people like. This is because it plots every point by default. To change this, go into WIN **(note: in RPN mode you need to hold Left-shift to enter the plotting utilities)** and change STEP from default to a number such as three. Then check pixels next to it. This means that it only plots every third pixel and then connects them. You can do this with higher numbers, but with rapidly changing graphs it often looks bad.

To do piecewise functions, the easiest and clearest way for new users is to define several different functions. For example, if I wanted to do:

X^2 where x>0 and

(1/2)x where x<0,

I could define X^2 divided by (x>0) as Y1, and ((1/2)x) divided by (x<0) as Y2. Then if x is less than 0 for y1, it would be dividing by 0 so no line is shown. This can be done using an IFTE statement, but that is a little harder to do. Here is a relatively complicated example so you can see how it is done. This example uses three different pieces.

In this method, you define an algebraic with nested IFTE functions. IFTE means IF (this is true) then (do this action) else (do this action). For example:

If true: do this : else do this
'IFTE(X<0, EXP(X), IFTE(X<1,SIN(X),COS(X)))'

will graph as:
'EXP(X)' when X < O,
'SIN(X)' when 0 <= X < 1,
and as 'COS(X)' when 1 <= X.

This method is fast and easy once it is understood, but the other method will work as well.

For graphing step functions, you use either FLOOR or CEILING on the x. FLOOR gives the integer beneath X, CEIL gives the one above X. There will be a little connection between the steps unless you do the next step. To remove the unwanted lines, go into WIN and set STEP to 1 and check PIXELS. Then set flag 31 to "plot points only". This gives a neat, nice looking step function.

12) FILER, MATR & EQW tutorial

The filer, matrix writer and the equation writer are three of the most useful things in the calculator. You'll most likely find yourself using these more than any other programs. I'll give you a little bit of info about these so you can learn some of the tricks.

FILER: (note: I will be describing things as they appear in ROM 1.19-6. If you haven't upgraded yet, do it now)

The filer is one of the greatest tools on the 49. It makes memory management a whole lot easier. There are a lot of shortcut keys for doing things. For example, if you hit N, it sorts by name. You can even send programs to other calculators using X-modem or Kermit. Simply connect the calculators using a cord, select the files you'd like to transfer by using ENTER, and push the soft menu buttons SEND or XSEND

You can re-order your variables. Select them in the order you want ordered (or you can sort by name, size, etc and then use ENTER to select them all), then push ALPHA O, or use the ORDER soft menu button.

You can move and copy several files at once. Just select them using ENTER, and then do the desired operation.

To get rid of the purge confirm, go into the modes menu and set flag 76. This will make it so you'll never be asked "Are you sure?" when you try to delete things.

EQW: The equation writer will be your best friend. It makes entering large symbolics a breeze. The EQW does not display lists or matrices, so some commands will complete and say "error: result not editable in EQW". This means the answer is on the stack, but the EQW can't edit it. To look at it, you can either exit the EQW, or push HIST and then VIEW

Not all commands are doable in the EQW. Some require you to do them on the stack. Learn how to use the equation writer well. There are a lot of nifty trick involving the arrow and shift keys that let you jump around and re-order equations easily.

MTRW: The matrix writer is designed to allow for quick editing of matrices and vectors. While it doesn't have all the options as a full spreadsheet, it is quite powerful. When you first start the matrix writer, you see EDIT, VEC, <-WID,WID-> GO-> and Gov.

VEC will either have a little box next to it, or not. If the box is there, it means the matrix will be imported as a VECtor if there is only one row. This means on the stack it look like [this] instead of [[this]]. In textbook mode, a vector will have skinny brackets, whereas a matrix will appear with thick, black brackets. Some commands require vectors instead of matrices, so make sure you have the right type or it may not work.

Entering in numbers in the MTRW is very quick if you are in RPN mode. This is because you can just put a space between the numbers, and enter a whole string of them at once. So if I wanted to make a 3*3 matrix, I'd enter 1 2 3 ENTER. This would put me at 1,3. Then I'd move down to 2,1 and enter 4 5 6 7 8 9 ENTER. It would enter the first three, then automatically move down to the next row, and enter the last three.

To enter symbolic items into a matrix, it is easy to call the EQW to do this. Simply position the cursor on the place you want an equation entered, and push EQW. When you are done, the symbolic item will be entered into the matrix. It is very easy to edit a symbolic already in the matrix as well. Position the cursor on the item to be edited, push L-shift EDIT, and the EQW will load with the object. You can also copy things into the MATR by pushing HIST. Then you can select items from the stack and put them into the matrix.

13) Useful operating document locations

The manuals released with the 49 weren't all they were cracked up to be. While they do give a good idea on basic operations, they leave something to be desired for more advanced things. There are documents available out there, but they are hard to find unless you know where to look. So I've done the work and found these documents to help you out.

- http://www.hp.com/calculators/techsupport/graphing/49g_userguide/

  Advanced 49 Manuals: All the 49 manuals are available here. The advanced users guide isn't included with older calculators, so you can download it here. In addition, there is a command reference as well as a listing of all CAS commands. An excellent reference guide to helping find out what those cryptic commands mean.

- http://www.hpcalc.org/details.php?id=3937

  48G user manual: The 49G is based heavily on the 48G, and most of the old information is still valid for the 49G. This has a much more detailed programming section, and covers tons of stuff in the 49 in great detail. It is large, 16 Mb, so be prepared for a wait if you aren't on high speed.

- http://www-fourier.ujf-grenoble.fr/~degraeve/

  CAS manual: This site has a 129 page manual detailing CAS operation for the 49G. In addition, it also talks about algebraic programming at the end and about the only document that does so on the internet. There are both French and English versions here. In addition, a French version of the 40G CAS manual is also available. If you'd like English, it is available at:
  http://www.hp.com/calculators/france/prod/casenglish.zip
  Reading the 40G CAS manuals can be helpful because it is based on the 49's CAS, and some of the explanations in there are better than the ones in the 49G CAS manual.

- http://www.gubookstore.com/shopgu/author.php3?accountID=GRTU00214

  Science and Engineering Mathematics with the HP-49G vol. 1 and 2: A professor by the name of Dr. Gilberto E. Urroz has written two incredible manuals for the Hp-49G. They cost 20-25$ apiece, but are well worth all of it. Both are several hundred pages long and incredibly detailed. They include worked "real world" problems as well as keystrokes and basic operations. I'd go so far as to say that if you plan on going into higher math, the second volume is a necessity as it deals with Uni./multi variate calculus, ODEs and PDEs, and statistics; all with an engineering slant.

14) Useful programming document locations

- http://www.hpcalc.org/hp48/docs/programming/usrtutpd.zip

  Programming in UserRPL: This book by Eduardo M. Kalinowski is for the 48G, but since UserRPL is compatible between the 48G and the 49G, this is still the best online book to learn userRPL programming. UserRPL is the easiest programming language do on the calculator (although you can do sysRPL and assembly on-calc as well), and is explained slightly in the calculator's manuals. A very good resource.

- http://www.hpcalc.org/hp48/docs/programming/stut_pdf.zip

  Programming in SysRPL: Another fine book by Eduardo, this is 249 pages, and covers almost everything anyone wants to know about sysRPL programming. SysRPL is much more powerful then userRPL, is very fast and a lot of fun to use. While it is 48G specific, almost all of the information is applicable to the 49G.

- http://www.hpcalc.org/hp48/docs/programming/asm-pdf.zip

  Introduction to Saturn Assembly Language: F.H. Gilbert and Eric Rechlin put this together. It is 141 pages of instruction for programming in assembly for the HP calcs. While not completely finished (it stops at the graphics section), this is still one of the best resources to learn HP assembly.

- http://www.courbis.com/voyage48g.html

  Voyage to the center of the HP48: While this book is in French, it covers basically everything about programming the HP calculators in ASM and sysRPL. Using an online translator, you can get the basics of nearly everything, and if you've already read some of the other books, the code should be a lot of help.

- http://www.hpcalc.org/hp49/docs/programming/hp49sysrpl_pdf.zip

  Using the HP49G for SysRPL programming: Yet another fine Eduardo document, this one is specifically for the HP-49G. It doesn't teach programming, but rather teaches you how to program on the calculator using a variety of tools, both built in and external. A must if you plan on programming on the calculator.

15)Websites for help

- http://www.hpcalc.org/hp49/docs/faq/

  49 FAQ: There are many questions about the 49 here. This is a good place to start before looking elsewhere for information.

- www.hpcalc.org

  Hpcalc.org: THE site for HP calculators. Everything is here. Be sure to e-mail Eric and thank him for his site.

- www.area48.com

  Area48: Another great HP site that has lots of information on helping new beginners. A good place to look for help and answers. E-mail them to say thanks for the hard work.

- **Comp.sys.hp48** (newsgroup)

  Comp.sys.hp48 is a newsgroup. People can get on here and post/answer questions, have discussions, and interact while having a lot of fun. When asking questions, make sure that you are specific, and tell all of the things you've tried so far. A good question that has details and things already tried will be much more likely to be answered well.

  Here's a nice story. Joe Schmo (that's you) gets on and posts, "My program won't work. What is wrong?" He waits for a couple of hours, and finally Nick gets on and asks, "What program? What is it doing? What have you tried?" Someone else responds "More details please." VPN makes a funny statement and then asks for more details, etc. Joe then has to write more details, and wait several more hours before someone can finally understand his problem. Moral of the story: When you post, give details and specifics. It makes helping Joe Schmo (YOU) much easier! (it's also a good idea to search google.groups to see if someone has asked you r question before; see below)

  There are several ways to access comp.sys.hp48.

  www.newsranger.com: This is one of many internet sites that allows free online newsgroup access. You just register and then sign up. I use this one mostly.

  http://groups.google.com/groups?q=comp.sys.hp48&meta=site%3Dgroups: This is a direct link to google groups. They have old postings up for search, so before posting it is always a good idea to search for your question. Most likely it has been answered before. This will get you the answer quicker then having to wait for someone to respond to you.

  Up above, click on "search only in comp.sys.hp48" and then type in a few keywords. Typing 49 will usually help get responses dealing with just the 49 as well. So you could type "invalid card data 49" and search. Then you'd get back a bunch of responses, and if you clicked on them, they'd all say "Type the PINIT command." =)

You can also access it by using most e-mail programs. I won't give details on all of them because it is probably in the help file of your program.

16) Solvers

The 49G has several numeric solvers built into it. They are in the NUM.SLV menu. There is one to solve any equation you enter, a differential equation solver, a polynomial solver that solves for coefficients and roots, a solver for systems of linear equations, and a financial solver. Experiment with them as they are very useful and powerful

17) Transferring programs

Transferring programs to the 49G can be quite annoying for some people. This is usually due to two problems.

1. They transfer something and it comes out as a string "HPHP49-C..."

This means that the program was transferred incorrectly for some reason. This can happen if transferring with binary mode, instead of ASCII, or vice versa. The way to fix this is to type in this: 256 ATTACH MEM DROP ->A 26 + A-> (-> means the arrow character, r-shift 0)

A library called OT49 has this as a command called ObFx(Object Fix). I recommend you send OT49 to the calculator first, and then execute this command if you ever have this happen.

2. Transferring programs is SO SLOW!

   The HP Connectivity Kit program uses Kermit protocol to transfer. It is very easy to use, but is very slow. ASCII and Binary mode, which are the two options of transferring for Kermit, are very slow for transferring programs. I recommend using Xmodem to transfer things which is much faster. I use the Xmodem Connectivity Kit which is found at the link below along with a lot of other communication programs. You can use almost any standard communication program to communicate with your HP as both Kermit and Xmodem are universal transfer protocols.

   http://www.hpcalc.org/hp49/pc/link/

18) What is that USER key thing above ALPHA?

USER is to put the keyboard into user mode. User mode allows you to assign programs and different things to the keys.

For example, I prefer to have my CMD key in the place of the HIST key. So I assign CMD to the HIST key, and assign the HIST to CMD. I use CMD more than HIST, so I want quicker access. I'll show you how to do this using Keyman (a small and very useful program for assigning keys)

(note: these instructions are in RPN mode) First install Keyman into port 2 and do a warm start (ON-C). Now go into the libraries and get into Keyman. Push NXT. Now push the K&SA. Then you push the key you want to recall the **K**ey number **& S**tandard **A**ssignment (see where the name came from? =). Now push HIST. It returns some external's and 41.1. Push the right arrow to swap the items, then drop the number. Now push NXT, and then A?D (assign and delete). Click L-shift HIST. It disappears. Now do K&SA again, but push CMD this time. Delete the number, and push A?D. Now assign it to HIST.

Now lock your USER mode. Push L-shift Alpha twice or until it says USR at the top of the screen. Push HIST. What happens? ;-)

This is just an example of what you can do. Read the Keyman documentation for more help. User keys are really nice. You can change the order of the keyboard to how you like it; you can assign games to have quick access; you can basically make the calculator keyboard into whatever you want. Other suggestions are making quick toggling buttons for flags and modes, switching MODES and CUSTOM, FILER and APPS, etc.

If you'd like to get an assignment that does auto-completion of commands and makes the CAT much more useful, check out this link. Make sure you have Emacs, Keyman and OT49 installed before starting.

http://groups.google.com/groups?q=CAT+assign&hl=en&group=comp.sys.hp48&rnum=3&selm=3AED318B.8F8C6091%40math.fu-berlin.de

19) "Required Programs" to make life a lot easier

I call these required, but in no way are they actually required. They are just programs I have found incredibly useful to help make the calculator more fun to operate. Not everyone will use them, these

are just programs that I happen to like a lot. All are available on hpcalc.org. The latest versions may only be on the author's web page they have given next to their names (in the (H) on hpcalc.org).

OT49: This program has many useful tools for general users and advanced programmers. Worth having for the ObFx command if nothing else. Includes a on-calc compressor/decompressor that can be used to store large things in less space.

Keyman: This utility makes key assignments for user keys much easier and adds the option to do long-press and double-click, just like a mouse.

Emacs: Useful for advanced programmers. Useful for the CAT button assignment in the link above. Also has regular expression search capability.

ConfigSaver: Makes it very easy to save your flags, user-keys, startup variables, etc. into port 1or 2 so after an accidental memory clear they can be restored easily.

Moonlight: Has different looking menu buttons for different object types. Makes it a lot easier to identify file types in the vars menu and has header imporvements. I like it a lot. =) It does slow down operations slightly however, and if you like everything to be as fast as possible you'll probably not like it.

APPSman: This program lets you create your own APPS menu. It will access quickly and you can add whatever you'd like. I remove the unnecessary things from my APPS menu like the filer, equation writer, etc that are accessible from the keyboard.

Libman: Allows you to reorder the library menu to your liking, remove things, etc. Also makes access time quicker.

Unitman: Allows you to create your own custom units and unit directories. This is a must have, if you want your calculator to do simple things like currency conversion.

Stat49Pro: Supplements the HP49 statistics package with a graphic user interface front end and a data manager. The most powerful statistics program for any calculator!(don't believe me? try it =)

AutoSimp49: Does some automatic simplification which helps new users cope with the calculator. Don't expect miracles from it, but it does do things like dividing polynomials automatically. Useful for new users who aren't familiar with the CAS operation.

Be sure to send e-mails to these authors thanking them for their hard work. They really appreciate it and it encourages them to write more great programs. :-)

20) basic CAS operations

The CAS in the 49 takes a while to learn. This is because it has so many commands and abilities. In addition, there are many flags that can change the way the calculator solves things. It would be far beyond the scope of this document to go through everything in the CAS I'll just go over some of the common questions people have.

- Why does the INT command not integrate?

  INT is not the symbolic integration command. It is used to do direct substitutions into integrals. To do this, you use INTVX or RISCH. INTVX (like all other commands that end in VX) uses the variable at the top of the CAS setup screen in the MODES menu (you can see what this is by looking at the top of the header. If it is X, you'll see a 'X' at

the top in the middle) . So if this variable is 'X' , and you run INTVX on X, you'll get ½x^2. RISCH lets you specify a variable. So you'd enter X as your equation, X as the variable to integrate, and then you'd get back ½x^2.

- How do I solve differential equations?

  Use 'x^2+y^2=25' for this example.

  If y is a function of x, then you must tell the HP49G that y depends on x. Your equation should be written as: 'x^2+y(x)^2=25' or else the HP49G takes y as something that doesn't depend on x, and so it returns 0.

  In RPN mode type 'x^2+y(x)^2=25', press ENTER , type 'x' press ENTER and then DERIV (or red-shift, COS for the curly differentiation d) . This returns 2x+2y(x)*d1y(x)=0. Now enter y(x) on the stack and apply SOLVE. This returns –X/d1y(x) which is the answer.

- How do I take a limit for two varaibles?

  Look at this thread for the answer.

  http://groups.google.com/groups?hl=en&threadm=cd9ca36b.0110110334.19bebc5f%40posting.google.com&rnum=2&prev=/groups%3Fq%3Dlimit%2Btwo%2Bvariables%26hl%3Den%26group%3Dcomp.sys.hp48%26rnum%3D2%26selm%3Dcd9ca36b.0110110334.19bebc5f%2540posting.google.com

Contributors to this document

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and anyone else I've forgotten. . .

How do I contact you (Tim Wessman)?

Well it will be pretty hard until December of 2003. I will be in Honduras until then serving a religious mission for my church (www.lds.org), and will not be doing anything on the computer until I get back. So if you send an e-mail to me at timwessman@yahoo.com, I won't be able to answer it until December 2003, and probably won't even get it because my mailbox will be full.

If you'd like to write me a snail mail letter however (talking about things other then calculators), you can send an email with the subject of "Tim's mail address in honduras" or something like that. My parents will check occasionally for these types of messages. Then they'll send it to you.

P.S. For anyone who wants to maintain this document while I'm gone, add things, etc. I'd be grateful. No need to ask permission from me first. Just drop me an email when I get back! :-)