



## hp calculators

### HP 12C **Frequently Asked Questions**

*Tips on Errors and Other Troubleshooting*



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## HP 12C Frequently Asked Questions

### Clearing, Resetting or Testing the Calculator

**“Do I need to clear the machine (or certain registers) before beginning a new calculation? If so, how do I do this?”**

As you use the HP 12C, your results from previous calculations will remain in their respective registers until you clear them or change them. But the arithmetic work area (called the “stack”) is designed so that generally, you do not need to clear the display to begin a fresh arithmetic calculation. (There is much more information about this available on [Basic Arithmetic](#).)

However, for other sorts of calculations, you will occasionally wish to clear certain sets of registers—for example, the financial (TVM) registers or the statistical registers. For more details on such circumstances, read the information on [Registers, Storage and Memory](#), and also on [Clearing, Editing and Correcting](#).

**“What about clearing the whole machine—resetting everything? How do I do that?”**

The HP 12C has Continuous Memory, which preserves your data and programs even when the display is turned off. (In fact, Continuous Memory is preserved—for a short time—even in the absence of any power source. This allows you to change the batteries when necessary.) This means that whatever was in the display—and every other register—when you turned off the calculator will still be there when you turn it back on.

Once in awhile, you may wish to reset the Continuous Memory entirely (i.e. erase all your data and programs and restore all machine settings to their default or “factory” states). If so, turn off the calculator, hold down the  $\square$  key, then press and release  $\square$ . You should see **Pr Error** (“Power Error”), indicating that the power to the circuitry has been discharged so that all your input information is gone—the HP 12C is back to factory conditions. (Again, for more details, read the information on [Registers, Storage and Memory](#) and on [Clearing, Editing and Correcting](#).)



## HP 12C Frequently Asked Questions

### Clearing, Resetting or Testing the Calculator (*cont.*)

**“My HP 12C doesn’t respond to keystrokes—it’s locked up. How do I reset it to operate normally?”**

First make sure that the batteries aren’t low or discharged (and replace them if they are). Then, if that doesn’t fix the problem, take these steps, in order, one at a time, stopping when you get normal operation again. (If none of these solves the problem, the machine needs repair.)

1. Press **ON** and **PMT** simultaneously, then release. (This will alter the contents of the X register.)
2. If Step 1 doesn’t work, remove the batteries, then re-insert them (taking care that they are properly oriented, as shown on the diagram on the back of the calculator). The Continuous Memory should not be lost if you do this in a short time (a minute or two).
3. If Step 2 doesn’t work, *momentarily* short the battery terminals together (with, for example, a paper clip). This will reset Continuous Memory—all your programs and calculations will be erased—and it may take several presses of **ON** to get a normal display.

**“My HP 12C responds to keystrokes, but I don’t think it’s working correctly. Can I test it?”**

Yes, this test will not reset Continuous Memory; your data and programs will be preserved: With the machine off, press and hold down the **ON** key, then press and hold down the **⊗** key, then release **ON**, then release **⊗**. The display will show “running,” but if everything is normal, within about 25 seconds, it will stop and *turn on every item possible in the display* (**8**’s, commas and annunciators, except the battery \*). Press any key thereafter to restore the normal display. If the self-test ends by going blank, showing **Error 9** or anything except that described above, the machine needs service.

*For more details on all of the above, you should consult your Owner’s Handbook, as well. Look in the Appendix for Battery, Warranty and Service.*







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## HP 12C Frequently Asked Questions

### Getting Numbers to Display Correctly

“How do I set the number of decimal places?”


Press the gold  key, then the desired number of places. For example, to set 4 decimal places, you'd press  4. To see 9 decimal places, press  9. To see 0 decimal places, press  0. Bear in mind that this display setting is rounding only your *view* of the number—not the value itself. The HP 12C carries 10 digits internally on all values, *regardless what portion it is showing to you*. (There is more information available about [Display and Operating Modes](#).)

“My numerical display has two digits apart from the others, over to the right. What is this?”

This is scientific notation—another way to represent numbers, particularly very large or small values. (There is more information available about such [Display and Operating Modes](#).) To set this notation, you somehow pressed  . To restore a normal decimal places setting, just choose the number of places you want and proceed as discussed above.

“My decimal point has been replaced by a comma! Why? How can I fix this?”

This is “European notation.” In the U.S., the decimal places are separated from the integer portion of a number by a period; and the thousands, millions, billions, etc (every three places to the left) are marked off by commas. It's the reverse in Europe and much of the rest of the world.

Finding your machine in the wrong mode this way is a little disconcerting, especially because the procedure to switch back and forth is not a single keystroke; you really have to try to do it. But apparently a power fluctuation or other minor “machine event” can sometimes cause this mode to change “spontaneously,” so don't blame yourself unduly. In any event, to switch back, turn off the calculator, press and hold the decimal point key, and (while holding down that  key) turn the machine back on. Presto.



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## HP 12C Frequently Asked Questions

### That Strange **RU<sup>nn</sup>nn** **n** Message

“When my calculator is doing a lengthy computation, its ‘running’ message appears cut in half horizontally. Why aren’t those message letters all full-height? Is my display broken?”

There’s nothing wrong with your HP 12C’s display—it’s behaving correctly. It’s simply that the letters in any displayed message must be formed by the same LCD segments that form the digits of the normal numerical, and in the case of the word **RUNNING**, there are not enough display segments available in the HP 12C to form the uppercase letters **R** and **N** and **G**.

However, you can use lowercase letters to form that word—with one minor modification: Since a lowercase **g** has a descender (a part below the base line), the base line of the whole word has to be “lifted” (to a level halfway up the display) in order to show the **g** correctly. So all the other letters appear “half-height,” because they are sitting on an elevated baseline.

Yes, this was an engineer’s trick to simplify the display design. It made little sense to add more display segments—and thus product cost—just to make an occasional message look prettier. (OK, so can *you* think of another word or phrase that would convey the same message as “running” but use the available display segments without resorting to such typography tricks?)



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## HP 12C Frequently Asked Questions

### Other Strange Items in the Display

**“What’s that little C annunciator at the bottom right of the display?”**

It signals that the HP 12C will use **C**ontinuous compounding for any partial period of interest, rather than straight-line (simple) interest. To clear (or set) this mode, just press **STO****EE****X**. This mode does not affect any TVM calculation where the value in the n-register is an integer (a whole number). For more details on using a non-integer n value, read below about common TVM questions. (See also [Time Value of Money Basics](#)).

**“Why is there a flashing asterisk (\*) in the lower left corner of the display?”**

That indicates a low battery level. After this signal first appears, you still have some time to change the batteries before the power runs completely out and loses the calculations and/or programs you have stored.

If you’re using **alkaline** batteries, you can run the calculator continuously for at least 2 hours or maintain the memory contents (with the calculator turned off) for at least a month.

If you’re using **silver-oxide** batteries, you can run the calculator continuously for at least 15 minutes or maintain the memory contents (calculator turned off) for at least a week.

**“What are those other annunciators, USER and GRAD, that appear during the self-test?”**

Those weren’t used on the HP 12C, but they were used on other HP calculator models designed at the same time. A single display component was built for all such models, so it had to include all the features of every model.



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## HP 12C Frequently Asked Questions

### Changing the Sign of a Number (positive to negative or vice versa)

“How do I make a positive number negative or a negative number positive?”

Press the  $\boxed{\text{CHS}}$  key. You can do this anytime during the digit entry process. (To change the sign of the exponent when entering a value in scientific notation, you must press the  $\boxed{\text{EEX}}$  key first.)

### Calculating Roots and Powers

“I see the key for square root ( $\boxed{\sqrt{x}}$ ), but what if I want to take a cube (3rd) root or the 4th root? For that matter, how do I take the 3rd or 4th power of a number?”

Take the second question first. Suppose you want to calculate  $5^4$ . Of course, that's  $5 \cdot 5 \cdot 5 \cdot 5$ , and you could certainly do it with simple multiplication ( $5 \boxed{\text{ENTER}} 5 \boxed{\times} 5 \boxed{\times} 5 \boxed{\times}$ ) and get the right answer: **625.00** (See [Basic Arithmetic](#).) But you can also do it with the  $\boxed{y^x}$  key:  $5 \boxed{\text{ENTER}} 4 \boxed{y^x}$ .

Likewise, to find  $16^3$ , you could either press  $16 \boxed{\text{ENTER}} 16 \boxed{\times} 16 \boxed{\times}$  or  $16 \boxed{\text{ENTER}} 3 \boxed{y^x}$ . (Answer: **4,096.00**)

How about roots? How do you take the 4<sup>th</sup> root of 625? As it turns out, the  $n$ th root of a number is simply that number raised to the  $1/n$  power. That is, the 4<sup>th</sup> root of 625 is  $625^{1/4}$  (or  $625 \cdot 25$ ).

So you can use the  $\boxed{y^x}$  key for finding roots, too:

$625 \boxed{\text{ENTER}} 4 \boxed{1/x} \boxed{y^x}$   
or:  $625 \boxed{\text{ENTER}} .25 \boxed{y^x}$

(Answer: **5.00**)

Likewise, to get the cube (3<sup>rd</sup>) root of 4,096, press  $4096 \boxed{\text{ENTER}} 3 \boxed{1/x} \boxed{y^x}$ . (Answer: **16.00**)



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## HP 12C Frequently Asked Questions

### Questionable Results with **AMORT**

“Why doesn’t **AMORT** give correct results when I amortize a loan with payments in advance (i.e. **BEGIN** mode)?”

First of all, are you sure you really *want* to be calculating in **BEGIN** mode? Most mortgages, for example, have payments in arrears (i.e. **END** mode). You ought to check into this (and there’s a lot more information available about [Mortgage/Loan Basics](#)).

If you really do want **BEGIN** mode, then to get correct results with **AMORT** after you calculate the PMT, when you’re ready to begin amortizing with **AMORT**, you must *first clear the n-register*, by storing a 0 in there (i.e. by pressing 0 **STO**). Then proceed with **f AMORT** as usual. (There is more information available under [Amortization \(AMORT\)](#).)

“Why is **AMORT**’s remaining balance different from a simple FV calculation?”

The difference is small, but real: **AMORT** *rounds* each result (interest and principal paid, and remaining balance) *to match the number of decimal places currently set on the HP 12C display* (usually two places, to carry balances to the realistic precision of pennies). This is not merely the display showing you a rounded balance; the value in the machine literally has only zeroes beyond the decimal places it is showing you. There’s more information available about this under [Amortization \(AMORT\)](#).

Contrast this with FV, which does a single TVM calculation (carrying all ten digits in each value) to determine the final balance. You may want to read more information about [Time Value of Money \(TVM\) Basics](#) and [Mortgage/Loan Basics](#).



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## HP 12C Frequently Asked Questions

### Wrong Answers with the TVM keys

**“Why am I getting wrong results (or error messages) for my TVM calculations?”**

Above all, you should read the information under [Time Value of Money \(TVM\) Basics](#)—and probably [Mortgage/Loan Basics](#), too. But first, while you’re here, some TVM errors are pretty common (we all make them occasionally), so check this list:

Have you set the proper payment mode (BEGIN vs. END)? This will affect the results in any TVM calculation where the PMT is not zero.

Have you forgotten to clear (i.e. reset to zero) one or more of the TVM registers? The calculator uses four variables to solve for the fifth, but it’s easy to overlook a variable if its value in the situation is simply zero. For example, what about the FV register for a fully amortized loan? If the loan is to be completely paid off, the Future Value must be set to zero, but if there was another value in there from your previous calculation, it will remain there until you clear it. (How to clear the FV register? You can either key in a zero and press **FV** or you can clear all five financial registers, via **fCLEARFN**. See [Clearing, Editing and Correcting](#) for more about that.)

On the other hand, sometimes you may be using **fCLEARFN** too often—erasing the results of a previous calculation that you really wanted to use. If you’ve just solved for an interest rate of, say, 8.375%, and you want to use this in a subsequent calculation, it may already be sitting right where you want it—in the *i* register; using **fCLEARFN** would erase it and force you to key it in again.

Have you correctly matched the time periods, the interest rate and the PMT’s? *They must agree!* You can’t key in a monthly payment and an annual interest rate and then expect a correct solution for, say, the remaining balance (FV).



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## HP 12C Frequently Asked Questions

### Wrong Answers with the TVM keys (*cont.*)

Since monthly payments are so common, the HP 12C has two very handy keys,  $\boxed{9} \boxed{12x}$  and  $\boxed{9} \boxed{12\div}$ , that convert the loan term and interest rate, respectively, from an annual basis to a monthly basis (and then store the resulting values in  $n$  and  $i$  registers). But once in awhile, you may find yourself doing a calculation in annualized terms (or in another period basis other than months) and mistakenly using  $\boxed{9} \boxed{12x}$  and  $\boxed{9} \boxed{12\div}$ —through sheer force of habit—when you shouldn't. Those two keys are handy shortcuts that apply only when the PMT's, interest rate and term are all on a monthly basis.

If you're solving for  $n$ , be aware that the HP 12C will always give you a *whole-number* result for  $n$ . That is, it will *round up* to the next whole number of periods. The rationale for this is that the math that allows you to solve TVM problems really only applies when  $n$  is a whole number. Yes, a lot of actuarial calculations use partial periods—and other calculators produce them—but when PMT is not zero, exactly what does that fractional portion of the  $n$  value really mean? Does it mean that a partial PMT will be paid? If so, when? Before or after a partial period? And when does that period occur—before or after all the normal whole periods?

Mathematically, none of these interpretations is correct; the  $n$  value you get simply by using the standard TVM formula *has no meaning when it is not a whole number*. So the HP 12C gives you a rounded result. If you want to know the non-integer exact result, you must key in a guess for that value (somewhere between the rounded value you calculated and 1 less than that) and re-calculate Future Value (or one of the other known TVM variables in the problem). The HP 12C will make certain assumptions about when and how to take that partial period into account—read on here....

To remove the ambiguity inherent in a non-integer  $n$  value, HP has modified the standard TVM formula so that whenever you *key in* a non-integer (non-whole-number) value for  $n$ , the HP 12C will interpret this very specifically: The partial period comes at the *beginning* of the timeline (i.e. after PV but before the first whole period), and there is no “partial PMT” associated with this partial period. (You are given a choice as to how you wish the interest to accrue on PV during that partial period. The more common, default, choice is straight-line, or simple interest. The other choice—a mode in effect when the **C** annunciator is showing in the display—is **C**ontinuously compounding interest.)



## HP 12C Frequently Asked Questions

### Questions about Bond Calculations

#### “Why am I getting wrong results (or error messages) for my bond calculations?”

The HP 12C's bond keys work only for bonds with:

- a par value of 100
- an actual-days basis (365 days/year)
- semi-annual coupon periods

For any other type of bond, you'll need to do some of the calculating yourself. (See your Owner's Handbook for more about bonds.)

As for an error message (**Error 8**), you probably used the wrong date format or keyed in an impossible date. (See below for more about those causes of [Error 8](#).) Or maybe you used a maturity date that is either prior to, or more than 500 years after, the settlement date. Neither of those circumstances are allowed.

If none of those errors seem to be present, perhaps you've used a maturity date on a day that has no corresponding day six months prior—the coupon date. The calculator works on an actual days' basis, so it looks for a coupon date on the same day of the month as the maturity date. If that assumption leads it to an erroneous date as a coupon date, the machine signals an error.

For example, if your maturity date is December 31, the calculator will look to use June 31 as a coupon date, which it can't. The same goes for March 31 (because there's no September 31); May 31 (no November 31); and October 31 (no April 31). To get a closely approximate price or yield in all these cases, simply to move all dates forward one day—to the first of the next month.

What about a bond maturing on either August 29 or August 30? There's no February 29—not consistently enough, anyhow; coupons are paid (twice) during every calendar year. And there is never a February 30. What to do? For a bond maturing on August 29 or August 30, you could move all dates back one or two days, respectively, to get a close approximation.



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## HP 12C Frequently Asked Questions

### Error Messages

#### “Why am I getting an **Error 0** message?”

You probably tried to do an invalid mathematical operation—e.g. divide by zero, take the log or root of a negative number, etc. Check your numbers!

#### “Why am I getting an **Error 1** message?”

You tried to put a number larger than the maximum ( $9.999999999 \times 10^{99}$ ) into a storage register (via **STO+**, **STO-**, **STO×**, **STO÷** or **g 12x**).

#### “Why am I getting an **Error 2** message?”

You tried to do an invalid statistical calculation. The most common reason for this is that you've been accumulating single-variable statistical data (i.e. X values only) without paying any attention to what's being accumulated in the Y register. The HP 12C always accumulates both variables—and does calculations for both—even if you're only using X data. So if there are weird numbers in the Y register while you accumulate statistical points, this can give you an error when you then try to do statistical calculations.

This error will also occur when you simply don't have enough data points. For example, when the number of points—as indicated by the value stored in Register 1—is zero, you can't calculate a mean, a standard deviation, or any regression values. (In fact, you need at least two points to do a standard deviation.)



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## HP 12C Frequently Asked Questions

### Error Messages (cont.)

#### “Why am I getting an Error 3 message?”

You are trying to calculate an Internal Rate of Return (IRR) for a cash-flow situation that is complex enough that it might have multiple solutions for IRR. First, be sure to read through the information on [Discounted Cash-Flow Basics](#) and [Internal Rate of Return \(IRR\)](#), to be sure that you have correctly keyed in the data for the situation and are correctly using IRR.

If you're confident that the situation is correctly set up, it's quite possible that it is indeed complex enough to produce multiple solutions for IRR. This can happen, for example, when the cash flow groups have lots of sign changes (i.e. first some negative cash flows, then some positives, then some more negatives, etc.). In such cases, you can guide the HP 12C toward a solution by giving it a starting point—an initial guess from which it can begin its search. To do so, take these two steps:

Make a guess for the interest rate and key this rate into the i register.

Press **RCL** **9** **R/S**.

(Keep in mind that if your guess must be a periodic rate—the period matching the cash flows—which is not necessarily an annualized rate. If your cash flows are monthly, for example, your guess for the IRR must be monthly, too. So, for example, if you think a reasonable annualized guess for IRR would be 18%, then you'd key in 1.5% **i** **RCL** **9** **R/S**.)

Often your guess will be close enough to help the calculator find an IRR solution. But of course, that doesn't mean it's the only possible solution, so you may need to keep looking. How do you know if you've found them all? Here's the rule of thumb: *If there is any positive solution, it's the only positive solution, but there may be one or more negative solutions, too.*

So should you care about finding the negative solutions? If there is more than one solution to IRR, which is “correct,” anyway? Which rate describes what's really happening to your money in the investment? That's an entirely different issue. Be sure to read about [Internal Rate of Return \(IRR\)](#) and [Net Present Value \(NPV\)](#).



## HP 12C Frequently Asked Questions

### Error Messages (cont.)

#### “Why am I getting an Error 4 message?”

You tried to enter more than 99 program lines or go to a program line that doesn't exist. You'll also get this error if you try to do storage register arithmetic into any registers beyond R0 - R4.

#### “Why am I getting an Error 5 message?”

This is a catch-all for a variety of no-no's related mainly to TVM calculations. The most common goof is giving all cash flows the same sign. It's not an investment if the money is flowing in only one direction. At least one of the values PV, PMT and FV, must be of opposite sign to the other two (and 0 doesn't count as opposite)! Read [Time Value of Money \(TVM\) Basics](#) and [Mortgage/Loan Basics](#).

Other common TVM and financial calculations errors:

- You can't use a interest rate value,  $i$ , of  $-100$  (or any value more negative than that). After all, if the interest rate reduces the PV by 100% in a single period, you get zero thereafter. (This goes for NPV, too, by the way: The  $i$  value you use has to be greater than  $-100$ .)
- You can't solve for PMT if  $n = 0$ . (If there are no periods, there are no PMT's.)
- You can't solve for  $n$  if the interest rate is such that the PMT amount can never amortize the PV value to the FV value. This is the case in *negative amortization*: Suppose you ask how long it will take to pay off a 200,000 mortgage at 7% with monthly payments of \$1,000. The answer is: “Forever”—because the balance is growing, not shrinking (hence the term, negative amortization). The monthly interest on the starting balance is \$1,166.67 (that's  $\$200,000 \times .07/12$ ). The payment you've specified *doesn't even cover the interest*, let alone pay down any principal.
- You can't use a negative or non-integer (non-whole-number) value for the periods to be amortized when you use **AMORT**. Read more about **AMORT** under [Amortization \(AMORT\)](#).
- You can't do a depreciation when the values in the **n** or **X** registers are negative, too big, or non-integer.



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## HP 12C Frequently Asked Questions

### Error Messages (*cont.*)

#### “Why am I getting an **Error 6** message?”

You’ve probably tried to key in more than 20 cash flow groups—or more than 99 cash flows in a single group. Either that or you’ve specified a storage register that doesn’t exist (maybe because it has been converted to program lines). One other possibility: Somehow the value in the n register got reset to a negative or non-integer (i.e. not a whole number) value, and then you’ve tried to calculate NPV or IRR. (The n-value tells the machine how many cash flow groups to look for, so it gets upset and confused by a bad n-value, and it protests with the error message.)

#### “Why am I getting an **Error 7** message?”

There’s no solution for IRR—probably because the cash flows are either all positive or all negative. (After all, you have to have at least one cash-flow in each direction to have a valid investment/return situation to analyze, right?) Check your cash flows! Read through the information on [Discounted Cash-Flow Basics](#) and [Internal Rate of Return \(IRR\)](#), to be sure that you have correctly keyed in the data for the situation and are correctly using IRR.





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## HP 12C Frequently Asked Questions

### Error Messages *(cont.)*

#### “Why am I getting an **Error 8** message?”

You tried to perform an invalid calendar operation—probably an invalid date. Bear in mind that the calculator has two different date *modes*—formats in which you specify a date. For example, the date July 12, 2002 under D.MY format, would be represented as **12.072002**. By contrast, that same date under M.DY format would be represented as **7.122002**.

To set D.MY mode, press . The **D.MY** annunciator will appear in the lower part of the display. For M.DY mode, press . The **D.MY** annunciator disappears. (There’s no M.DY annunciator.)

Of course, no matter which mode the machine is set to, if you give it a nonexistent date (say, February 30, 2003), it will give you an Error 8 message every time. But be careful! Sometimes the HP 12C won’t catch your goof—it can’t read your mind, after all. For example, if you were to key in the above date (July 12, 2002), under the wrong format, the machine would understand that to mean December 7, 2002—a perfectly valid calendar date that it would then use in the calculation.

Also, **Error 8** will result if you try to specify an invalid maturity or settlement date when doing a bond calculation. See above, under [Bond Calculations](#), for more about that.

#### “Why am I getting an **Error 9** message?”

Your calculator may need repair. (But first, read [Clearing, Resetting or Testing the Calculator](#).)

#### “Why am I getting a **Pr Error** message?”

The power to Continuous Memory was discharged; the machine was reset—all your data and programs were erased. (You can do this intentionally, too. See [Clearing, Resetting or Testing](#) above.)