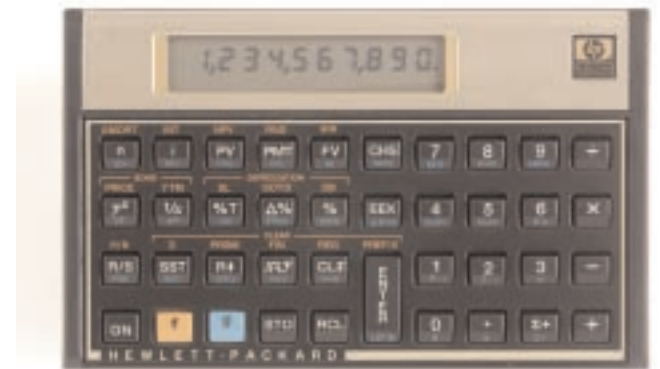




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HP 12C Discounted Cash Flow (DCF) Basics



[When to Use DCF Analysis Instead of TVM](#)

[Cash Flow Diagrams for DCF Analysis](#)

[Drawing a DCF Picture for Your HP 12C](#)

[More Practice Keying In DCF Situations](#)

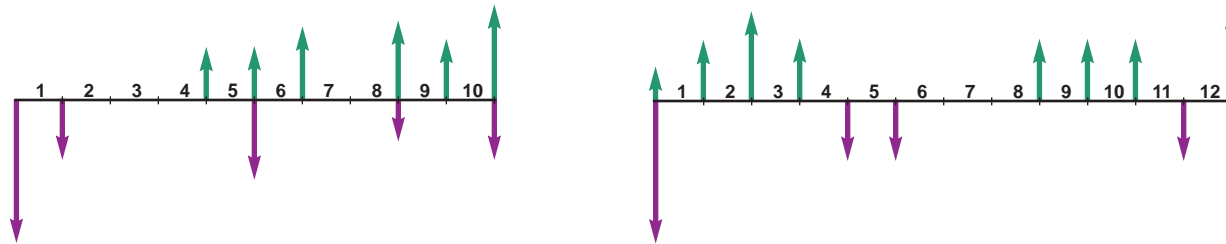


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HP 12C Discounted Cash Flow (DCF) Basics

When to Use DCF Analysis Instead of TVM

The five financial (TVM) registers form a handy and powerful tool for one common cash flow situation: where there is a steady PMT amount flowing uniformly, once per period. This amount may be zero, or positive or negative, but it must always be the same amount and it must occur exactly once—at the same time—each period. But there are plenty of investment and financial scenarios where such a uniform series of cash flows simply isn't present. Look at these examples:



You simply can't use the TVM registers on the 12C to analyze such situations, *because the periodic cash flows are uneven in amount and direction*. But you do have another set of tools that can help: the **Discounted Cash Flow (DCF)** keys. These keys include $\text{g} \text{CF}_0$, $\text{g} \text{CF}_j$, $\text{g} \text{N}_j$, $\text{f} \text{NPV}$ and $\text{f} \text{IRR}$.

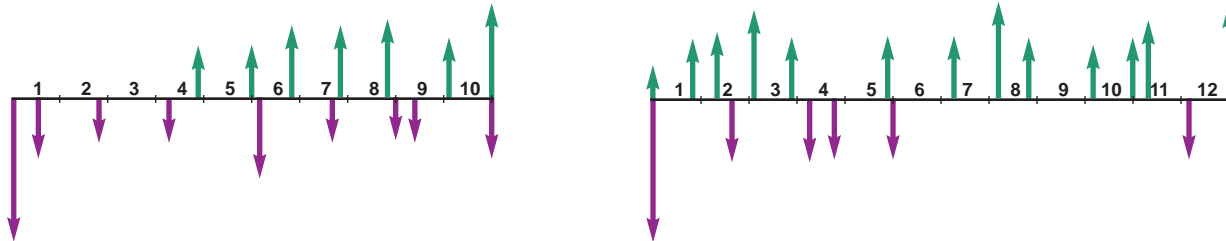
This discussion will focus on the first three of those keys: $\text{g} \text{CF}_0$, $\text{g} \text{CF}_j$ and $\text{g} \text{N}_j$. These are the keys you use to “draw the picture” for your calculator. The other two keys are the actual calculation keys, and they are large enough topics to merit their own separate discussions, which you will find at [Net Present Value \(NPV\)](#) and [Internal Rate of Return \(IRR\)](#).



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HP 12C Discounted Cash Flow (DCF) Basics

The DCF keys are not all-powerful. There are plenty of situations where not even the DCF keys can calculate NPV or IRR results exactly, such as these:



Notice the difference between these scenarios and those on the previous page (which are DCF-friendly): These here vary in the time between cash flows—a no-no for DCF.

The DCF keys still require a single cash flow each period. The cash flows may differ in amount and sign, but the time periods must still be uniform.

So whenever you have steady, uniform cash flow amounts (one per period), use TVM; whenever you have uneven cash flow amounts (but still uniform in time—one per period), use DCF.

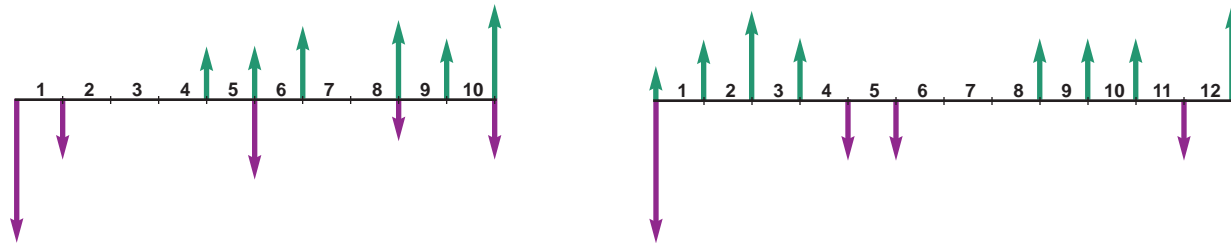


HP 12C Discounted Cash Flow (DCF) Basics

Cash Flow Diagrams for DCF Analysis

You're probably already familiar with cash flow diagrams from your work with TVM calculations. (If not, then you should stop here and read [Time Value of Money Basics](#) and [Mortgage/Loan Basics](#) before continuing here.)

The same rules apply to diagramming uneven cash flow situations:



- Pick one party's perspective and stick with it.
- The directions of the arrows tell whether you're receiving money (up) or paying it (down).
- The lengths of the arrows represent relative values—longer arrows mean more money.
- The horizontal axis is a time line that is marked at regular intervals denoting the periods at which interest compounds and cash flows occur.
- You can net (add) together any cash flows that occur simultaneously.

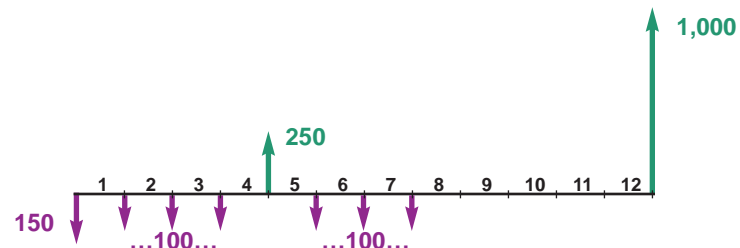
The same principle of discounting (sliding the cash flows up and down the time line, adjusting their values according to the prevailing interest rate) applies, too.



HP 12C Discounted Cash Flow (DCF) Basics

Drawing a DCF Picture for the HP 12C

Because of all the possible variations, the actual process of drawing a DCF picture for your HP 12C is a little more complicated than a TVM picture, but the calculator has been designed to help you simplify things. Basically, the idea is that you work chronologically (left to right) across the time line, keying in cash flows in **groups**—sets of identical consecutive flows. Take a look at this example:



Your verbal description to yourself:

“The cash flow at the beginning of the time line is $-\$150$.”

“The next cash flow group has flows of $-\$100$ each.”

“There are 3 such flows in this group.”

“The next cash flow group has flows of $\$250$ each.”

“There is 1 such flow in this group.”

“The next cash flow group has flows of $-\$100$ each.”

“There are 3 such flows in this group.”

“The next cash flow group has flows of $\$0$ each.”

“There are 4 such flows in this group.”

“The next cash flow group has flows of $\$1000$ each.”

“There is 1 such flow in this group.”

Your description to the calculator:

150 **CHS** **g** **CFo**

100 **CHS** **g** **CFj**

3 **g** **Nj**

250 **g** **CFj**

1 **g** **Nj**

100 **CHS** **g** **CFj**

3 **g** **Nj**

0 **g** **CFj**

4 **g** **Nj**



1000 **g** **CFj**






















1 **g** **Nj**



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HP 12C Discounted Cash Flow (DCF) Basics

Get the idea? One point that's handy (but not essential) to know: *If there is just a single cash flow in a group, you need not press 1  *—the HP 12C will assume that there is one such flow unless you specify otherwise. In other words, you could have entered the previous scenario as follows:



| | |
|--------------------------------|--|
| Group 0: -\$150 (initial flow) | 150    |
| Group 1: -\$100 (3 flows) | 100    3   |
| Group 2: \$250 (1 flow) | 250   |
| Group 3: -\$100 (3 flows) | 100    3   |
| Group 4: \$0 (4 flows) | 0   4   |
| Group 5: \$1000 (1 flow) | 1000   |

Question: Where does the HP 12C store the cash flow amounts (i.e. when you press  )?

Answer: In the numbered storage registers. (See also [Registers, Storage and Memory](#).)
Register **0** is for the amount of the initial cash flow;
the cash flow amount for group 1 is stored in Register **1**;
the cash flow amount for group 2 is stored in Register **2**; etc.

So you can have up to 20 cash flow groups, if all the numbered storage registers are available. (For more about that, see also [Clearing, Editing and Correcting Errors](#).)

The 20th group (or the last group allowed, if fewer than 20 numbered registers are available) is stored in the **FV** register.

To quickly check whether you've correctly entered a cash flow amount, therefore, you can recall that numbered storage register ( 2 for Group 2;  5 for Group 5, etc.)



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HP 12C Discounted Cash Flow (DCF) Basics

Question: But where does the HP 12C store the size of each cash flow group (i.e. $\boxed{9} \boxed{Nj}$)?

Answer: It uses other internal memory (not registers in the sense that you know them).

Question: Then how can you completely review a DCF “picture” after you’ve keyed it in—including the Nj values (the group sizes), to see if you’ve entered everything properly?

Answer: Reviewing a DCF situation is more involved than reviewing a TVM situation (which, after all, is just a matter of recalling four values: $\boxed{RCL} \boxed{n}$, $\boxed{RCL} \boxed{i}$, etc.), but you can do it.

First, you make sure that the n register contains the group number of the last group. If you have just completed the data entry process, n will already contain this number, because the n register is used as the group counter. (When you began with $\boxed{9} \boxed{CF_0}$ in the above example, n was set to 0.) Then, with each $\boxed{9} \boxed{CFj}$, it was increased by 1 (so its value from the example should now be 5—which you can check via $\boxed{RCL} \boxed{n}$).

Once n is correctly set, you simply “walk backwards” with the \boxed{RCL} key:

$\boxed{RCL} \boxed{9} \boxed{Nj}$ shows the number of flows in Group 5 (**1.00**).

$\boxed{RCL} \boxed{9} \boxed{CFj}$ shows the amount of each flow in Group 5 (**1000.00**).

$\boxed{RCL} \boxed{9} \boxed{Nj}$ shows the number of flows in Group 4 (**4.00**).

$\boxed{RCL} \boxed{9} \boxed{CFj}$ shows the amount of each flow in Group 4 (**0.00**).

$\boxed{RCL} \boxed{9} \boxed{Nj}$ shows the number of flows in Group 3 (**3.00**).

$\boxed{RCL} \boxed{9} \boxed{CFj}$ shows the amount of each flow in Group 3 (**-100.00**).

$\boxed{RCL} \boxed{9} \boxed{Nj}$ shows the number of flows in Group 2 (**1.00**).

$\boxed{RCL} \boxed{9} \boxed{CFj}$ shows the amount of each flow in Group 2 (**250.00**).

$\boxed{RCL} \boxed{9} \boxed{Nj}$ shows the number of flows in Group 1 (**3.00**).

$\boxed{RCL} \boxed{9} \boxed{CFj}$ shows the amount of each flow in Group 1 (**-100.00**).

$\boxed{RCL} \boxed{9} \boxed{Nj}$ shows the number of flows in Group 0 (**1**).

$\boxed{RCL} \boxed{9} \boxed{CFj}$ shows the amount of each flow in Group 0 (**-150.00**).

Find a mistake? It’s probably easiest to start over and re-enter the entire scenario. (There is a way to replace any specific value, but it’s fraught with possibilities for further error—see your Owner’s Handbook if you want to learn more about that.)



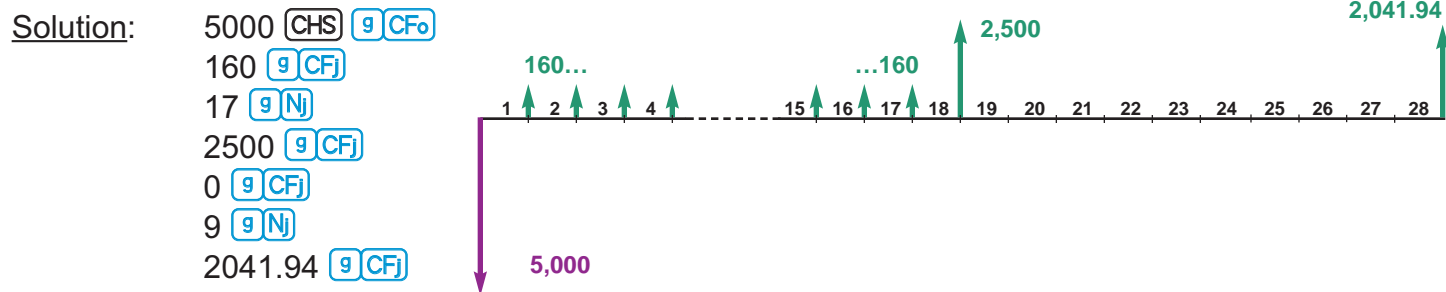
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HP 12C Discounted Cash Flow (DCF) Basics

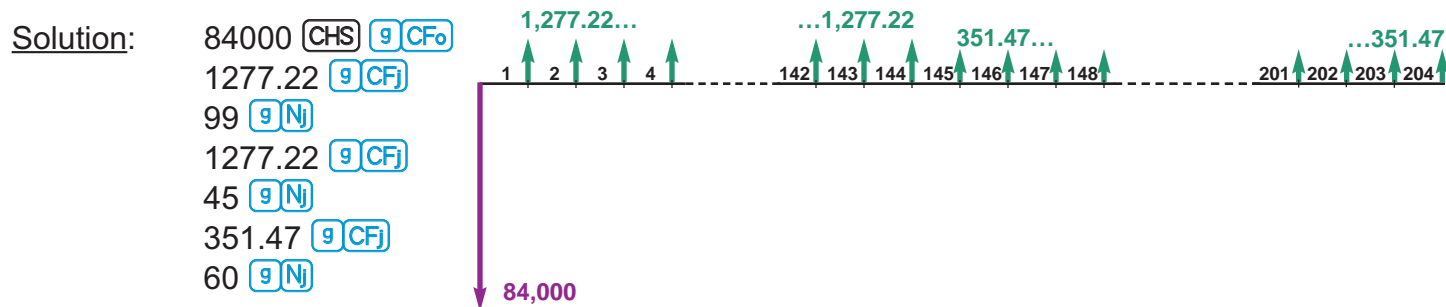
More Practice Keying in DCF Situations

Practice some more with these DCF investment scenarios here. Keep in mind how you can review your entries afterwards, if you wish. One note: The largest number of cash flows allowable in any one group is 99. If you have a group larger than that, break it into two or more consecutive groups.

Problem: Enter this cash flow situation on the HP 12C:



Problem: Enter this cash flow situation on the HP 12C:



Now that you're comfortable with the entry of DCF situations into the HP 12C, you're ready to do actual calculations, such as [Net Present Value \(NPV\)](#) and [Internal Rate of Return \(IRR\)](#).