



## hp calculators

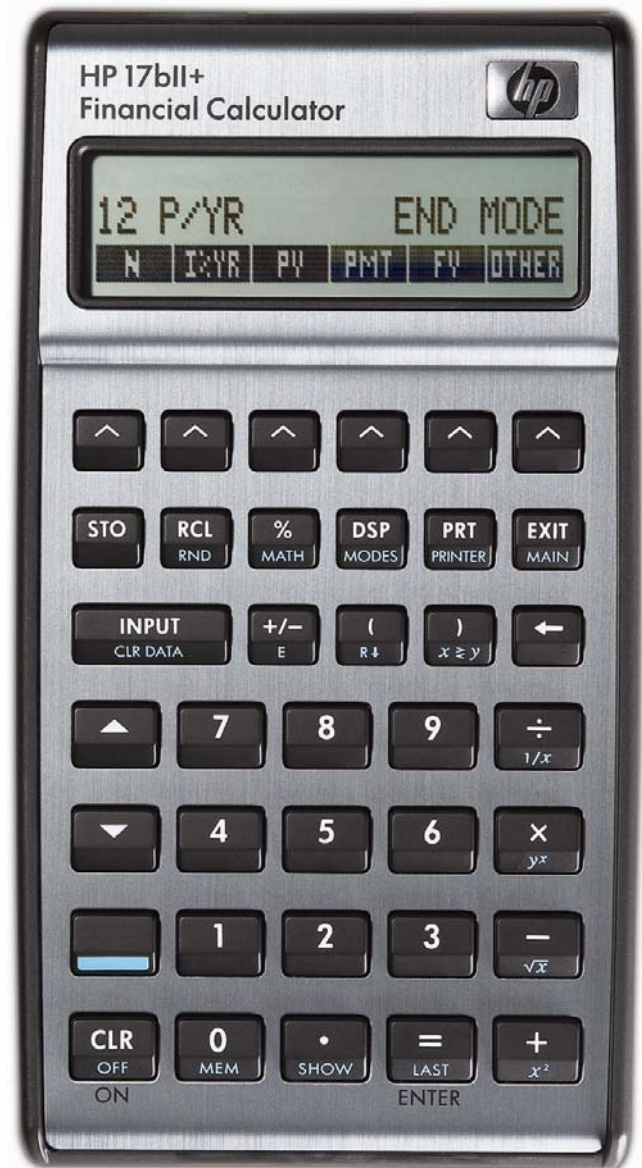
HP 17bII+ Cash flow analysis –  
Net Present Value

Cash flow analysis

Net Present Value

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## Cash flow analysis



There are times when a financial problem has either irregular or unequal payments. Since the time value of money application is not designed for these situations, the HP 17bII+ contains functions that solve these types of problems, commonly referred to as cash flow (CFLO) analysis.

As usually presented, CFLO problems have an initial negative cash flow followed by several positive cash flows. This might occur when a company is evaluating the purchase of a new machine. There would be an initial cash outlay to pay for the machine and then (hopefully) several periods of positive cash inflow as the result of the acquisition. Cash outflows are considered negative while inflows are considered positive.

CFLO problems routinely occur within financial applications such as capital budgeting, but the functionality built into the HP 17bII+ calculator is more flexible, allowing for the more general analysis of uneven and irregular payment situations.

## Net Present Value

The Net Present Value (NPV) is defined as the present value of future cash inflows net of the initial cash outflow. If this result is positive, then this is the amount in today's dollars by which the inflows exceed the outflows – it will be the amount of incremental benefit for entering into the transaction. If this result is negative, then this is the amount by which the outflows exceed the inflows – it will be the amount of incremental cost for entering into the transaction. The present value is found using an interest rate representing the cost of funds involved.

On the HP 17bII+, CFLO problems involving NPV are solved in the CFLO environment. This is entered by pressing  then .

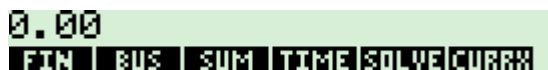


Figure 1











Figure 2



Figure 3

On this screen, the menu keys on the bottom of the display perform these functions:

-  – Ends the entry of cash flow data and enters the cash flow calculation environment.
-  – Creates an empty entry in the cash flow list to allow for the insertion of a cash flow.
-  – Deletes the currently displayed cash flow entry from the cash flow list.
-  – Allows the present cash flow list to be saved as a named list in calculator memory.
-  – Used to retrieve a previously named cash flow list from memory. Or, to start a new list, press  then , if you have already saved the current list.
-  – Toggles prompting for the number of times a cash flow occurs on or off. Default is ON. If turned off, the value used for the number of times a cash flow occurs is 1. The maximum value for this setting is 999. This setting is always turned on when you start a new cash flow list.

## HP 17bII+ Cash flow analysis – Net Present Value

The HP 17bII+ uses a different approach to handling cash flow problems than other HP calculators. Rather than storing the cash flows in registers, the HP 17bII+ stores cash flows in lists that can be named and saved for future use. This also provides the flexibility to have multiple cash flow situations stored within the calculator at the same time. The number of cash flow analyses and individual cash flows stored in this manner are only limited by the available calculator memory.

Maintaining a cash flow list is covered in more detail in another learning module.

### Entering cash flows

The initial cash flow is keyed (and changed to a negative number if appropriate) and entered using the **INPUT CLR DATA** key. If prompting for the number of times a cash flow occurs is turned on, you will need to enter the frequency for the cash flow and press **INPUT CLR DATA** again. If the default frequency of 1 is desired, then you can press **INPUT CLR DATA** twice in succession to proceed to the next cash flow. The remaining cash flows are entered in the same manner. When you have entered all cash flows, press **EXIT MAIN** followed by **EXIT CLR DATA** to enter the calculation environment, which appears as shown below.



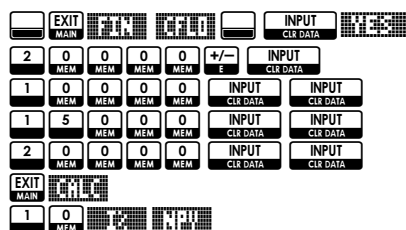
Figure 4

**NOTE:** The interest rate entered in the calculation environment is the PERIODIC interest rate. If the cash flows are monthly, then the interest rate should be the monthly interest rate. For example, if the interest rate is 6%, compounded monthly, and the cash flows being evaluated are monthly, then the interest rate entered should be 0.5.

### Practice solving Net Present Value problems

**Example 1:** A company is considering replacing a machine. It will require an initial cash outlay of \$20,000 and then is expected to generate cash flows the next 3 years of \$10,000, \$15,000 and \$20,000. If the cost of funds for the company is estimated at 10%, what is the Net Present Value? Should the machine be replaced?

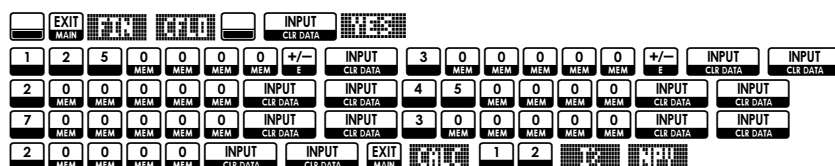
**Solution:**



**Answer:** \$16,513.90. If the company replaces the machine, they will be better off by \$16,513.90.

**Example 2:** A company is considering introducing a new product. It will require an initial cash outlay of \$1,250,000 and the company expects to get cash flows the next 6 years of -\$300,000, \$200,000, \$450,000, \$700,000, \$300,000 and \$20,000. If the company's cost of funds is estimated at 12%, what is the Net Present Value? Should the company introduce the new product?

**Solution:**



HP 17bII+ Cash flow analysis – Net Present Value

Answer: <\$412,893.92>. No, the company should not introduce the new product, since they will be over \$400,000 worse off if they do. Note that both of the first two cash flows were negative or cash outflows. Introducing a new product can often cause that situation.

Example 3: A company is considering expanding a product line, which will require an investment today of \$800,000. Future cash inflows are estimated to be \$190,000 a year for 6 years followed by \$90,000 a year for the 4 years thereafter. If the company's cost of funds is 15%, what is the Net Present Value? Should the new product be introduced?

Solution:

Answer: \$30,137.45. Yes, the product line should be expanded.

Example 4: Find the present value of \$200 three months from today, \$400 four months from today, \$200 a month from months 7 through 10, and \$1000 twelve months from today. Assume interest is assessed at 8%, compounded monthly. RPN mode is shown for the last line of the keystrokes. For algebraic mode, the last line would be: 8 ÷ 1 2 INPUT CLR DATA.

Solution: This example will illustrate how to use the DCF functions to solve non-annuity, irregular payment problems. The cash flows or payments for this example could be summarized as:

Month 0: \$0	Month 5: \$0	Month 10: \$200
Month 1: \$0	Month 6: \$0	Month 11: \$0
Month 2: \$0	Month 7: \$200	Month 12: \$1000
Month 3: \$200	Month 8: \$200	
Month 4: \$400	Month 9: \$200	

Answer: \$2,265.01.