

3

Cash Flow Worksheet

Three keys are used for performing cash-flow calculations.

CF lets you enter cash flow data.

NPV lets you compute net present value.

IRR lets you compute internal rate of return.

Press **↓** and **↑** to move through each set of variables.

Cash Flow Worksheet Labels

Key	Label	Meaning	Variable Type
$\boxed{\text{CF}}$	CFo	Initial cash flow	Enter-only
$\boxed{\downarrow}$	Cnn*	Amount of n^{th} cash flow	Enter-only
$\boxed{\downarrow}$	Fnn*	Frequency of n^{th} cash flow	Enter-only
$\boxed{\text{NPV}}$	I	Discount rate	Enter-only
$\boxed{\downarrow}$	NPV	Net present value	Compute-only
$\boxed{\text{IRR}}$	IRR	Internal rate of return	Compute-only

* **nn** represents the number of the cash flow (**C01–C24**) or the number of the corresponding frequency (**F01–F24**).

Notes about the Cash Flow Worksheet

- ◆ $\boxed{\text{CF}}$ $\boxed{2\text{nd}}$ $\boxed{\text{CLR Work}}$ sets all variable values to zero.
- ◆ $\boxed{2\text{nd}}$ $\boxed{\text{Reset}}$ $\boxed{\text{ENTER}}$ sets all variable values to zero.
- ◆ To enter cash-flow values and frequencies, press $\boxed{\text{CF}}$. You can enter the initial cash flow (**CFo**) plus up to 24 cash flows, each of which can be a unique value. Enter inflows (cash received) as positive and outflows (cash paid out) as negative. Use $\boxed{+/-}$ to enter a negative value.
- ◆ The **INS** and **DEL** indicators in the display let you know that you can use $\boxed{2\text{nd}}$ $\boxed{\text{INS}}$ and $\boxed{2\text{nd}}$ $\boxed{\text{DEL}}$ to insert or delete cash flows.

Interpreting the Results of IRR Calculations

When you compute a value for **IRR** (internal rate of return), the calculator displays either a solution or an error message.

When a solution is displayed, there are two possibilities.

- The displayed solution is the only solution.
- There may be additional solutions. This occurs when there are two or more sign changes in the cash flow sequence.

When an error message is displayed, there are two possibilities.

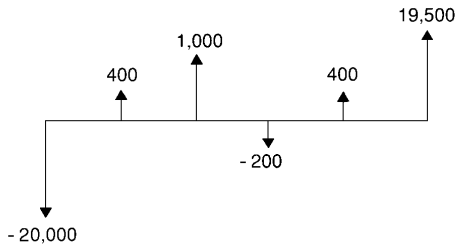
- No solution for **IRR** exists (**Error 5**). This occurs when there are no sign changes in the cash flow sequence.
- The calculator is unable to determine a value for **IRR** within a maximum number of iterations (**Error 7**).

For a detailed description of sign changes as they relate to **IRR**, refer to “IRR Calculations” in the Appendix.

Uneven and Grouped Cash Flows

Uneven Cash Flows

The Cash Flow worksheet lets you analyze the value of money over equal time periods. It allows you to enter uneven values, each of which can be either an inflow (cash received) or an outflow (cash paid out).



Similar to an annuity's present value (**PV**) in the TVM worksheet, a typical cash-flow problem usually has an initial cash flow (labeled **CF₀**). This is always a known, entered value.

Grouped Cash Flows

In some cash-flow problems, every cash flow may be a unique value. In other cash-flow problems, there may be consecutive cash flows of equal value.

You must enter unequal cash flows separately, but you can save time and space by using the **Fnn** variable to enter groups of consecutive cash flows of equal value.

Entering Cash Flows

You can enter the initial cash flow and up to 24 additional cash flows, each of which can be a unique value. Enter inflows as positive and outflows as negative. If you have consecutive cash flows of equal value, you can enter the cash-flow value and then a frequency of up to 9,999 for the number of times the value occurs.

Procedure: Entering Cash Flows

- 1 Press **[CF]** to select the cash flow entry portion of the Cash Flow worksheet.

CFo= and its current value are displayed.

- 2 If necessary, press **[2nd] [CLR Work]** to clear the worksheet.
- 3 Key in a value for **CFo** (initial cash flow) and press **[ENTER]**.
- 4 Press **[↓]** to display **C01**.

Key in a value for the first cash flow or group of cash flows and press **[ENTER]**. Enter an inflow (cash received) as a positive number; enter an outflow (cash paid out) as a negative number.

- 5 Press **[↓]** to display **F01**.

If there are multiple, consecutive, equal occurrences of the cash flow you entered, key in the number of occurrences (frequency) and press **[ENTER]**. The default value is 1.

- 6 Press **[↓]** to display the next available cash flow.

Key in the value of the cash flow(s) and press **[ENTER]**.

- 7 Press **[↓]**.

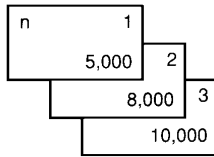
If there are multiple, consecutive, equal occurrences of the cash flow you entered, key in a value for the frequency and press **[ENTER]**.

- 8 Repeat steps 6 and 7 until all cash flows and frequencies are entered.

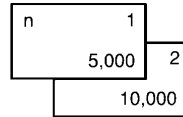
When you have entered all the cash-flow data, you can press **[↓]** or **[↑]** to review the entries.

Deleting Cash Flows

When you delete a cash flow, the calculator decreases the numbers of subsequent cash flows .



Before deleting
8,000 cash flow



After deleting
8,000 cash flow

Procedure: Deleting a Cash Flow

The **DEL** indicator lets you know when you can delete a cash flow.

- 1 Press \downarrow or \uparrow until the cash flow you want to delete is displayed.
- 2 Press 2^{nd} [DEL].

The cash flow you specified (and its frequency) is deleted. The calculator decreases the numbers of subsequent cash flows so that there is no gap.

Inserting Cash Flows

When you insert a cash flow, the calculator increases the numbers of the current and subsequent cash flows.



When inserting cash flows, remember that the most cash flows you can enter is 24.

Procedure: Inserting a Cash Flow

The **INS** indicator lets you know when you can insert a cash flow.

- 1 Press \downarrow or \uparrow until the display shows the current cash flow where you want to insert the new cash flow.

For example, if you want to insert a new second cash flow, display **C02**.

- 2 Press $\boxed{2nd}$ \boxed{INS} .
- 3 Key in the value of the new cash flow and press \boxed{ENTER} .

The new cash flow is entered “before” the current cash flow. The calculator increases the numbers of the current and subsequent cash flows. For example, **C02** becomes **C03**.

- 4 If necessary, press \downarrow , enter a value for the frequency, and press \boxed{ENTER} .

Computing NPV and IRR

IRR (internal rate of return) is the interest rate at which the net present value of the cash flows is equal to zero. **NPV** (net present value) is the sum of the present values for the cash inflows (cash received) and outflows (cash paid out).

A positive value for **NPV** indicates a profitable investment.

Procedure: Computing Net Present Value

- 1 Press **[NPV]**.
I= and its current value are displayed.
- 2 Key in a value for **I** (discount rate) and press **[ENTER]**.
- 3 Press **[↓]** to display the **NPV** variable label.
- 4 Press **[CPT]** to compute the net present value of the series of cash flows.

The calculator computes and displays the value.

Procedure: Computing Internal Rate of Return

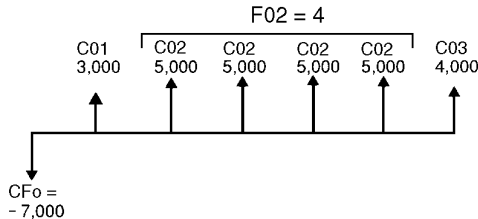
- 1 Press **[IRR]**.
IRR= and its current value are displayed.
- 2 Press **[CPT]** to compute the internal rate of return. The calculator computes and displays the value.

Uneven Cash Flows

A company plans to pay \$7,000 for a new machine. The company would like a 20% annual return on its investment. Over the next six years, the company expects to receive the annual cash flows shown below.

Year	Cash Flow Number	Cash Flow Estimate
1	1	3,000
2-5	2	5,000 each year
6	3	4,000

The following time line shows that these cash flows are a combination of equal and unequal values. Because the initial cash flow (**CF₀**) is an outflow, it is a negative value.



On the next few pages, you will enter cash flow data, edit the data when a change is necessary, and compute the net present value and internal rate of return.

Example: Entering Cash Flow Data

Procedure	Keystrokes	Display
Set all variables to defaults.	2nd [Reset] ENTER	RST 0.00
Select Cash Flow worksheet.	CF	CF0= 0.00
Enter initial cash flow.	7000 +/- ENTER	CF0= -7,000.00<
Enter cash flow for first year.	↓ 3000 ENTER ↓	C01= 3,000.00< F01= 1.00<
Enter cash flows for years two through five.	↓ 5000 ENTER ↓ 4 ENTER	C02= 5,000.00< F02= 4.00<
Enter cash flow for sixth year.	↓ 4000 ENTER ↓	C03= 4,000.00< F03= 1.00<

Example: Editing Cash Flow Data

(continued from previous example)

After entering the data, you learn that the cash flow projections you were given were incorrect. The \$4,000 cash-flow value should occur in the second year instead of the sixth. Otherwise, the entries are correct.

Year	Incorrect Cash Flow	Correct Cash Flow
1	3,000	3,000
2	5,000	4,000
3	5,000	5,000
4	5,000	5,000
5	5,000	5,000
6	4,000	5,000

Edit the existing data in the Cash Flow worksheet by deleting the \$4,000 value for year 6 and inserting it for year 2.

Procedure	Keystrokes	Display
Move to third cash flow.	\uparrow	C03= 4,000.00<
Delete third cash flow.	$\boxed{2nd}$ [DEL]	C03= 0.00
Move to second cash flow.	\uparrow \uparrow	C02= 5,000.00<
Insert new second cash flow.	$\boxed{2nd}$ [INS] 4000 [ENTER]	C02= 4,000.00<
	\downarrow	F02= 1.00<
Move to next cash flow to verify data.	\downarrow	C03= 5,000.00<
	\downarrow	F03= 4.00<

Example: Computing Net Present Value

(continued from previous example)

Compute the net present value (**NPV**) using an interest rate per period (**I**) of 20%.

Procedure	Keystrokes	Display
Access NPV .	NPV	I= 0.00
Enter interest rate per period.	20 ENTER	I= 20.00 <
Compute net present value.	↓ CPT	NPV= 7,266.44*

Example: Computing Internal Rate of Return

(continued from previous example)

Compute the internal rate of return (**IRR**).

Procedure	Keystrokes	Display
Access IRR .	IRR	IRR= 0.00
Compute internal rate of return.	CPT	IRR= 52.71*

The internal rate of return is 52.71%.

Value of a Lease with Uneven Payments

A lease with an uneven payment schedule usually accommodates seasonal or other anticipated fluctuations in the lessee's cash position.

Suppose a 36-month lease has the following payment schedule, with beginning-of-period payments.

Number of Months	Payment Amount
4	\$0
8	\$5000
3	\$0
9	\$6000
2	\$0
10	\$7000

If the required earnings rate is 10% annually with monthly compounding:

- What is the present value of these lease payments?
- What even payment amount at the beginning of each month would result in the same present value?

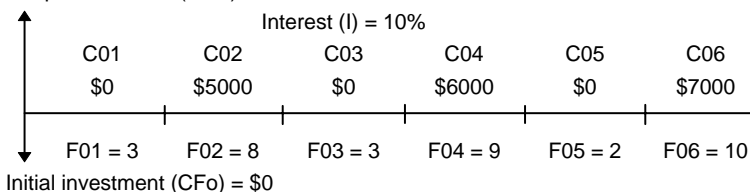
Because the cash flows are uneven, use the Cash Flow worksheet to determine the net present value (**NPV**) of the lease.

Example: Compute Net Present Value of Cash Flows

The cash flows for the first four months are stated as a group of four \$0 cash flows. Because the lease specifies beginning-of-period payments, you must treat the first cash flow in this group as the initial investment (**CF₀**) and enter the remaining three cash flows on the cash flow screens (**C01** and **F01**).

Note: The BGN/END setting in the TVM worksheet does not affect the Cash Flow worksheet.

Net present value (NPV) = ?



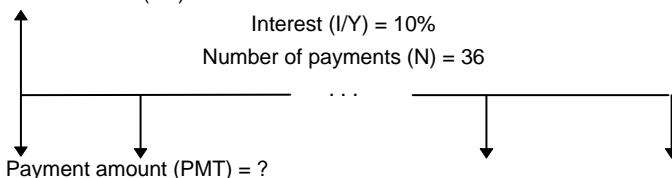
Procedure	Keystrokes	Display
Set all variables to defaults.	2nd [Reset] [ENTER]	RST 0.00
Select Cash Flow worksheet.	[CF]	CF₀= 0.00
Enter first group of cash flows.	↓ ↓ 3 [ENTER]	C01= 0.00< F01= 3.00<
Enter second group of cash flows.	↓ 5000 [+/-] [ENTER] ↓ 8 [ENTER]	C02= -5000.00< F02= 8.00<
Enter third group of cash flows.	↓ ↓ 3 [ENTER]	C03= 0.00< F03= 3.00<
Enter fourth group of cash flows.	↓ 6000 [+/-] [ENTER] ↓ 9 [ENTER]	C04= -6000.00< F04= 9.00<
Enter fifth group of cash flows.	↓ ↓ 2 [ENTER]	C05= 0.00< F05= 2.00<
Enter sixth group of cash flows.	↓ 7000 [+/-] [ENTER] ↓ 10 [ENTER]	C06= -7000.00< F06= 10.00<
Select NPV.	[NPV]	I= 0.00
Enter monthly earnings rate.	10 [÷] 12 [ENTER]	I= 0.83<
Compute NPV.	↓ [CPT]	NPV= -138,088.44*
Store in memory 0.	[STO] 0	NPV -138,088.44

Example: Compute Equivalent Monthly Payments

(continued from previous example)

Use the net present value (**NPV**) from the Cash Flow worksheet as the present value (**PV**) in the TVM worksheet to compute the equivalent even monthly payment that is equivalent to the uneven cash flows.

Present value (PV) = NPV from Cash Flow worksheet



Procedure	Keystrokes	Display
Set beginning-of-period payments.	2nd [BGN] 2nd [SET]	BGN
Return to calculator mode.	2nd [QUIT]	0.00
Enter NPV as PV and make it positive.	RCL 0 [+/-] PV	PV= 138,088.44<
Enter interest per year.	10 [I/Y]	I/Y= 10.00<
Enter number of payments.	36 [N]	N= 36.00<
Compute payment.	CPT PMT	PMT= -4,418.90*

At the required earnings rate of 10%, the present value of the lease payments is \$138,088.44. An even monthly payment of \$4,418.90 would result in the same present value.