

MR200

User Guide for the **Financial Calculator**

Everything you need to solve finance exercises with MR200: time value of money, nominal and effective rates, amortization schedules, inflation, NPV and IRR. Every example in this guide was checked on the calculator itself.

6 tools in one calculator

TVM · Interest · Amortization · Inflation
· NPV/IRR · Scientific

Worked examples

Step-by-step inputs and exact results

Common mistakes

Signs, rate per period, END/BGN

Free, no download

On phone and computer, in 7
languages

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To the calculator

mr200.educo.academy/en



200 exercises and 6 exams

mr200.educo.academy/en/practice.html

1 Before you start

Opening and layout

Open mr200.educo.academy/en in any browser. There is nothing to download and no sign-up.

- **Vertical layout:** made for phones. All fields in one column, with the result below them.
- **Horizontal layout:** made for computers and phones held sideways. Tabs on one side, fields in the middle, results on the other side. A full amortization schedule fits on one screen.
- Switch with the  **Vertical** |  **Horizontal** button at the top of the page. On a phone held upright the button is hidden; just turn the phone sideways.

Type expressions instead of numbers

In almost every field you can type a short calculation. Press **Enter** or move to the next field, and the expression is replaced by its result.

You type	You get	Useful for...
12*30	360	a 30-year mortgage with monthly payments
6/12	0.5	turning a 6% annual rate into a monthly rate
1.05^10	1.6289	powers (in the finance tabs and the scientific calculator)

Every tab has a Clear button

Press it before each new exercise. A number left over from an earlier exercise is the #1 cause of strange results.

2 TVM: time value of money

The first tab solves any problem that has a single amount, a series of fixed payments, or both: a loan, savings, a deposit or a bond. In every exercise you fill in **four** variables and press **CPT** next to the fifth, and the calculator computes it.

Field	Meaning	Note
N	number of periods	in the same units as the payment: months for a monthly payment
I/Y	interest rate per period , in percent	1 means 1%, not 0.01
PV	present value: the amount today	loan amount, initial deposit
PMT	fixed payment each period	monthly repayment, monthly deposit, coupon
FV	future value: the amount at the end	balance at the end, face value of a bond

⚠ The sign rule: the most important rule in this guide

Money that comes **in** to you is positive; money that goes **out** is negative. In a loan, PV is positive (you received money) and PMT is negative (you pay). In savings, the deposits are negative and FV is positive. If all amounts have the same sign, the calculator returns "Error".

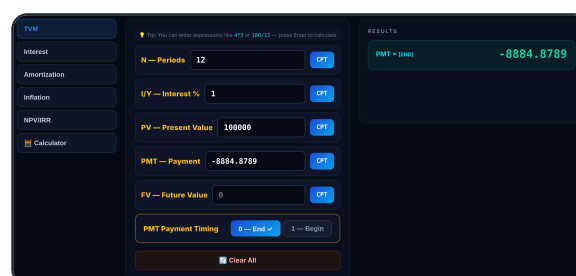
Payment timing: **0 – End** (the default) fits most loans. **1 – Begin** fits rent, savings deposited at the start of the month, and an immediate annuity.

Example 1 Monthly loan repayment

You took a \$100,000 loan for 12 months at 1% per month. What is the monthly repayment?

N 12 **I/Y** 1 **PV** 100000 **FV** 0 CPT → **PMT**

PMT = -\$8,884.88 per month The minus sign: this is a payment going out from you



Example 1 in the horizontal layout: the payment appears in the PMT field and in the results panel

Example 2 How much will the savings grow to?

You deposit \$500 every month for 5 years at 0.5% per month. How much will you have at the end?

N 60 (or 5*12) I/Y 0.5 PV 0 PMT -500 CPT → FV

Deposit at the end of each month (0 — End): **\$34,885.02**

Deposit at the start of each month (1 — Begin): **\$35,059.44**

The difference comes from the fact that, when you deposit at the start of the month, every dollar earns one more month of interest.

Example 3 What annual return did you earn?

You invested \$10,000 and received \$15,000 after 5 years. What is the annual return?

N 5 PV -10000 PMT 0 FV 15000 CPT → I/Y

I/Y = **8.4472%** per year

Mind the signs: the money you invested went out (negative), and the money you received came in (positive).

The screenshot shows a financial calculator interface with a dark theme. On the left is a sidebar with menu items: TVM, Interest, Amortization, Inflation, NPV/IRR, and Calculator. The main area has a tip at the top: "Tip: You can enter expressions like 4*3 or 100/12 — press Enter to calculate". Below the tip are input fields for N — Periods (5), I/Y — Interest % (8.4472), PV — Present Value (-10000), PMT — Payment (0), and FV — Future Value (15000). Each field has a CPT button to its right. At the bottom of the input section is a "PMT Payment Timing" section with "0 — End" selected and "1 — Begin" as an option, and a "Clear All" button. On the right side, under a "RESULTS" header, the calculated value "IY = [END] 8.4472" is displayed in a green box.

Example 3: finding the rate from present value and future value

Example 4 How many payments until the loan is repaid?

A \$50,000 loan at 1% per month, and you can repay \$1,000 a month. How many months will it take?

I/Y 1 PV 50000 PMT -1000 FV 0 CPT → N

N = **69.66**: that is, 70 payments, with the last one smaller than the rest

3 Nominal and effective interest

The bank quotes an annual **nominal** rate but charges it every month. Because of compounding, the **effective** rate, meaning what you actually pay or earn over a year, is higher.

- 1 Enter the annual nominal rate in percent.
- 2 Enter how many times a year interest is charged: 12 for monthly, 4 for quarterly, 2 for semi-annual.
- 3 Press **Calculate Rates**.

Example 5 12% nominal, compounded monthly

Annual Nominal Rate 12

Periods per Year 12

Periodic rate: **1.0000%** per month Annual effective rate: **12.6825%**

$$r_{eff} = (1 + r_{nom} / m)^m - 1 = (1.01)^{12} - 1 = 12.6825\%$$

TVM

Interest

Amortization

Inflation

NPV/IRR

Calculator

Nominal & Effective Interest

Annual Nominal Rate (%) 12

Periods per Year 12

Calculate Rates Clear

RESULTS

Periodic Interest Rate 1.0000%

Effective rate annual 12.6825%

The Interest tab: periodic rate and annual effective rate

💡 When does this matter?

When comparing offers. 12% compounded monthly costs more than 12.5% compounded yearly, because it equals 12.68% effective.

4 Amortization schedule

This tab builds the full repayment schedule of a loan and shows, for every payment, how much of it is interest, how much is principal, and the balance left. You can choose between two schedule types:

Fixed Payment (Shpitzer)

The monthly payment is fixed. At first most of it is interest, and over time the principal part grows.

Equal Principal

You repay the same amount of principal every month. The payment is high at first and goes down gradually.

⚠ The rate in this field is the rate per period

If payments are monthly, enter the **monthly** rate in the **Annual Interest (%)** field. For a 6% annual loan, type **6/12** and the calculator will use a monthly rate of **0.5%**.

Example 6 A \$100,000 loan, 6% a year, 12 monthly payments

Loan Amount 100000

Annual Interest (%) 6/12

Number of Periods 12

	Fixed Payment (Shpitzer)	Equal Principal
First payment	\$8,606.64	\$8,833.33
of which interest	\$500	\$500
of which principal	\$8,106.64	\$8,333.33
Second payment	\$8,606.64 (fixed)	\$8,791.67 (decreasing)
Total interest	\$3,279.72	\$3,250.00

With Equal Principal you pay less interest in total, because the principal goes down faster. With Fixed Payment you pay a little more, but the payment is fixed and predictable.

The screenshot shows a software interface for calculating an amortization schedule. On the left is a sidebar with navigation links: TVM, Interest, Amortization (selected), Inflation, NPV/IRR, and Calculator. The main area is titled 'Amortization Schedule' and contains input fields for Loan Amount (100000), Annual Interest (%) (0.5), Number of Periods (12), and Schedule Type (Fixed Payment (Shpitzer)). Below these are buttons for 'Show Amortization Schedule' and 'Clear'. On the right, a 'RESULTS' section displays 'PMT' as \$8606.64 and 'Interest total' as \$3279.72. Below this is a table with 12 rows, each representing a payment period, with columns for Period, PMT, Interest, Principal, and Balance.

Period	PMT	Interest	Principal	Balance
1	\$8607	\$500	\$8107	\$91893
2	\$8607	\$459	\$8147	\$83746
3	\$8607	\$419	\$8188	\$75558
4	\$8607	\$378	\$8229	\$67329
5	\$8607	\$337	\$8278	\$59059
6	\$8607	\$295	\$8311	\$50748
7	\$8607	\$254	\$8353	\$42395
8	\$8607	\$212	\$8395	\$34001
9	\$8607	\$170	\$8437	\$25564
10	\$8607	\$128	\$8479	\$17085
11	\$8607	\$85	\$8521	\$8564
12	\$8607	\$43	\$8564	\$0

A Fixed Payment schedule: each row shows period, payment, interest, principal and balance. The balance reaches 0 at the last payment. The table shows up to 24 periods, and the totals are calculated over the whole loan

5 Inflation and real interest

A 10% rate sounds good, but if prices rose 3%, your purchasing power grew by less than 10%. This tab calculates the **real** rate using the Fisher equation, and it has two modes.

$$(1 + r_{nom}) = (1 + r_{real}) \times (1 + \pi) \rightarrow r_{real} = 1.10 / 1.03 - 1 = 6.7961\%$$

Example 7 Mode A: the rate and inflation are known

You save \$10,000 for 5 years at 10% a year, and inflation is 3% a year.

Nominal Interest 10

Inflation 3

Initial Value PV 10000

Number of Periods 5

Period Type Annual

Nominal future value: **\$16,105.10** Real rate: **6.7961%** Real value in today's prices: **\$13,892.40**

Change in purchasing power: **+38.92%**

Field	Value
Nominal Interest (%)	10
Inflation (%)	3
Initial Value PV	10000
Future Value FV	16105.10
Number of Periods	5
Period Type	Annual
Nominal Future Value (FV)	\$16105.10
Interest Real	6.7961%
Real value at end (in today's prices)	\$13892.40
Purchasing Power Change	+38.92%

Mode A: the calculator gives the future value, the real rate and the real value

Example 8 Mode B: finding the rate from the amounts

You deposited \$10,000 and received \$12,000 after 3 years, and inflation was 2% a year. Leave the **Nominal Interest field empty** and fill in FV.

Nominal Interest (empty)

Inflation 2

Initial Value PV 10000

Future Value FV 12000

Number of Periods 3

Annual nominal rate: **6.2659%** Real rate: **4.1822%**

6 NPV and IRR

Both tools answer the same question: is the investment worth it? You enter each year's cash flow, where CF_0 is the initial investment and is therefore negative, and the discount rate (the cost of capital).

- **NPV:** the value the investment adds, in today's dollars. A positive NPV means the investment is worth it.
- **IRR:** the internal rate of return. If it is higher than the cost of capital, the investment is worth it.

Time-saving tools

- **The $\pm$ button** next to each cash flow flips its sign. Typing a minus is hard on a phone, and this solves it.
- ⚡ **Uniform CF:** enter an amount and a number of years, press **Fill**, and all the rows are filled at once.
- **+ Add Row / - Remove Row:** up to 8 cash flows after CF_0 .

Example 9 A \$100,000 project that brings in \$30,000 a year for 4 years

CF_0 -100000

Uniform CF 30000 $\times$ 4 $\rightarrow$ Fill

Discount Rate 10

NPV = **-\$4,904.04**: negative, so **✗ Reject**

IRR = **7.71%**: lower than the cost of capital (10%)

Both tools agree: the investment returns less than the cost of capital. If the fourth year's cash flow is \$60,000 instead of \$30,000, you get an NPV of \$15,586.37 and an IRR of 16.2297%, and the investment becomes worth it.

The screenshot shows a financial calculator interface with a dark theme. On the left is a sidebar with menu items: TVM, Interest, Amortization, Inflation, NPV/IRR (selected), and Calculator. The main area is titled 'NPV / IRR' and includes a note: 'CF₀ = Initial investment (negative) | Up to 8 cash flows'. It features input fields for cash flows: CF₀ (-100000), CF₁ (30000), CF₂ (30000), CF₃ (30000), CF₄ (30000), and CF₅ (0). Each field has a $\pm$ button. Below these are 'Add Row' and 'Remove Row' buttons. A 'Uniform CF' section has inputs for '30000' and '4', with a 'Fill' button. A 'Discount Rate (%)' field is set to '10'. At the bottom are 'Calculate NPV' and 'Calculate IRR' buttons, and a 'Clear All' button. On the right, a 'RESULTS' panel shows 'NPV =' with a red value of '\$-4904.04' and a red 'Decision' of '✗ Reject'.

Example 9: a negative CF_0 , four cash flows of 30,000 and a 10% discount rate

7 The scientific calculator

Use the  **Calculator** tab when you need a free calculation: a power, a root, a logarithm, or checking a step in a solution. You can type directly from the keyboard and press Enter.

Example 10 The compound interest factor for 5% over 10 years

Type Press

Result: **1.6288946268** So every dollar grows to \$1.63

Available functions: parentheses.

8 5 common mistakes

The mistake	What to do
1. All amounts with the same sign	Money going out is always negative. In a loan: PV positive and PMT negative. In savings: deposits are negative.
2. An annual rate with monthly periods	N and I/Y must be in the same time unit. For a monthly payment, type 6/12 in the rate and 5*12 in the periods.
3. 0.01 instead of 1	Enter the rate in percent: 1 means 1%. If you type 0.01, the calculator will use 0.01%.
4. End or Begin	Check when the payment is made. Rent and most savings: 1 – Begin . Most loans: 0 – End .
5. Numbers left over from a previous exercise	Press Clear before each new exercise, and check that the field you are solving for is empty or that you don't need its value.

Want to practise?

The practice page has 200 exercises in 8 topics and 6 full exams with a detailed solution for every question: mr200.educo.academy/en/practice.html

9 From learning to doing

The tools in this guide are the same tools investors use to compare returns, understand the cost of a loan and evaluate investments over time. Once you understand compounding, real interest and NPV, you may want to start investing yourself. The offer below is intended for residents of Israel.



Want to start investing?

Open a trading account with Interactive Israel and trade on the Israeli and global capital markets.

Open an account →

For residents of Israel · Registration page in Hebrew

Disclosure: The link to Interactive Israel is an affiliate link of PROMIK Investments Ltd., which may receive a commission on accounts opened through it. Nothing in this guide is investment advice, investment marketing or a recommendation to take any action in securities, and it is not a substitute for advice tailored to each person's data and needs. This guide is for learning only. Investing in the capital market involves risk, including loss of principal.

Good luck in your exams!

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