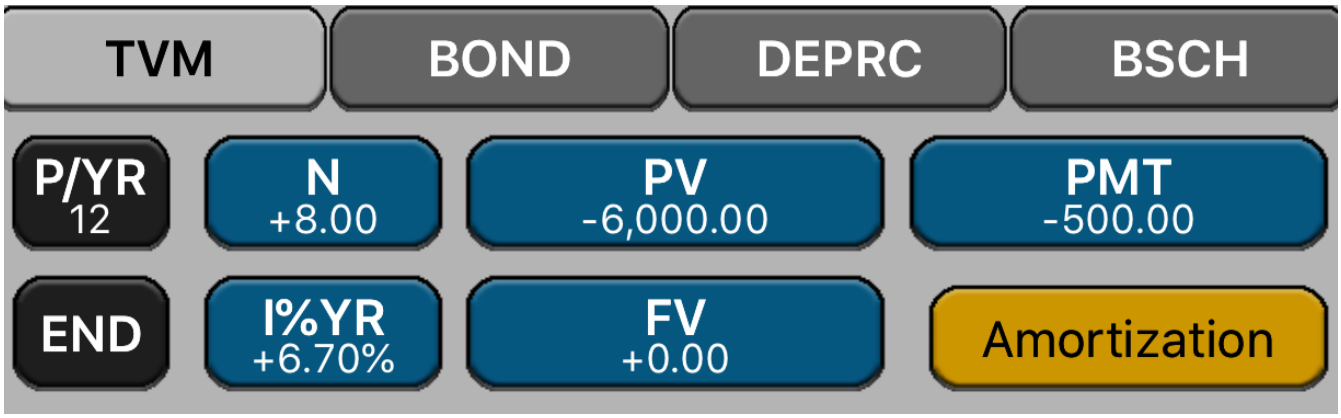
Time Value of Money Menu

The “Time-Value-of-Money” (TVM) menu calculates Compound Interest problems involving money earning interest over a period of time. It is specially suited for loans, savings, mortgages and leasing calculations.
To show it, touch the “**Finance**” button in the main menu, and select the “**TVM**” option.



The blue keys of the TVM menu represent the variables in the well known “Time Value of Money” equation.

$$\mathbf{PV + (1 + S \cdot i) \cdot PMT \cdot [1 - (1 + i)^{-N}] \div i + FV \cdot (1 + i)^{-N} = 0}$$

where: “**i**” = “**I%YR**” ÷ (“**P/YR**”) ÷ 100
“**S**” = 1 for “**BEG**” mode and “0” for “**END**” mode.

Any of the **[N]** , **[i%]** , **[PV]** , **[PMT]** or **[FV]** variables can be calculated if the other four are known. If any other key is pressed before one of these keys, the displayed number is stored in the corresponding variable. Otherwise, the variable is calculated. The colors of the buttons corresponding to each variable changes according the performed action. The buttons turn **Blue** if the value is stored in the variable and, **Red** if the variable was calculated.

Variable	Description
[N]	Stores or calculates the number of compounding periods. If [Shift] [N] is pressed, the number in the display is multiplied by "**P/YR**" and stored in "**N**".
[I%YR]	Stores or calculates the nominal interest rate per year in percent corresponding to each of the "N" periods. If [Shift] [I%YR] is pressed, the number in the display is divided by "**P/YR**" and stored in "**I%YR**".
[PV]	Stores or calculates the Present value of the series of future "PMT" amounts. "PV" always occurs at the beginning of the first period.
[PMT]	Stores or calculates the the amount of each periodic payment. "PMT" can occur at the beginning or end of each period.
[FV]	Stores or calculates the Future value of the series of previous "PMT" amounts. "FV" always occurs at the end of the last period.
[BEG]	Sets Begin mode; used when payments occur at the beginning of each period. Sets "S = 1" in TVM equation.
[END]	Sets End mode; used when payments occur at the end of each period. Sets "S = 0" in TVM equation.
[P/YR]	Stores the number of payments or compounding periods per year. The value must be a positive integer from 1 to 365.
[Amortization]	Shows the Amortization menu for calculating the amount of payment applied to interest & principal for a given period.

Cash Flow Sign Convention

The values entered in the **[PV]**, **[PMT]** or **[FV]** registers must consider the proper sign. Positive numbers correspond to money received (**Cash-In**). Negative numbers correspond to money paid (**Cash-Out**).

Example : Calculating [N]

How long should be a $25,000.00 loan with an interest rate for 6.7% per year if you can paid only $500.00 per month?. Solution:

Solution: Follow the next sequence:

[Shift] [CLEAR DATA]	Clears all the TVM variables
[END]	Set the END mode.
"12" **[P/YR]**	Set the number of payments per year to 12.
"6.7" **[I%YR]**	Stores the interest rate percent. **I%YR = 6.7**
"25000" **[PV]**	Stores the loan amount. **PV = 25,000.00** (Cash-In)
"500" **[+/-]** **[PMT]**	Stores the periodic monthly payment. **PMT = -500.00** (Cash-Out)
[N]	Calculates the number of payments required. **N = 58.79** (months)

Example : Calculating [I%YR]

What annual interest rate must be obtained to accumulate $10,000 in 8 years on an investment of $6,000 with quarterly compounding?.

Solution: Follow the next sequence:

[Shift] [CLEAR DATA]	Clears all the TVM variables
[END]	Set the END mode.
"4" **[P/YR]**	Set the number of payments per year to 4.

“8” [↴] [N]	Stores the number of periodic payments. **N = 32.00** (quarters)
“6000” **[+/-]** [PV]	Stores the negative loan amount. **PV = -6,000.00** (Cash-Out)
“10000” [FV]	Stores the future value of the investment. **FV = 10,000.00** (Cash-In)
[I%YR]	Calculates the quarterly interest rate percent. **I%YR = 6.44** (%)

Example : Calculating [PV]

What is the maximum purchase price of an asset that gives a monthly net cash flow of $1,230 during a period of 5 years and the selling price at that time is $10,000. Also, you want at least a 15% return per year.

Solution: Follow the next sequence:

[END]	Set the END mode.
“12” **[P/YR]**	Set the number of payments per year to 12.
“5” [↴] [N]	Stores the number of periodic payments. **N = 60.00** (months)
“15” [I%YR]	Stores the interest rate percent. **I%YR = 15.00**
“1230” [PMT]	Stores the monthly payments. **PMT = 1,230.00** (Cash-In)
“10000” [FV]	Stores the selling price. **FV = 10,000.00** (Cash-In)
[PV]	Calculate the present value. **PV = -56,448.22** (Cash-Out)

Example : Calculating [PMT]

What is the monthly payment on 25-year, $89,560 mortgage at 5.25% annual interest, compounding monthly?.

Solution: Follow the next sequence:

[END] "0" **[FV]**	Set the END mode & clear future value
"12" **[P/YR]**	Set the number of payments per year to 12.
"25" **[↴]** **[N]**	Stores the number of periodic payments. **N = 300.00** (months)
"5.25" **[I%YR]**	Stores the interest rate percent. **I%YR = 5.25**
"89560" **[PV]**	Stores the mortgage amount. **PV = 89,560.00** (Cash-In)
[PMT]	Calculates the periodic payment. **PMT = -536.69** (Cash-Out)

Example : Calculating [FV]

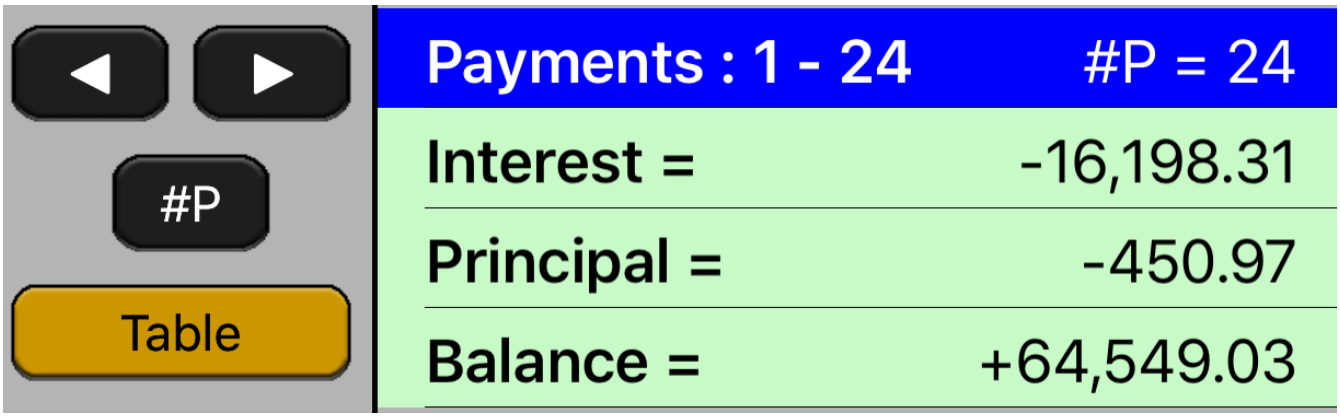
A saving account offers a nominal rate of 4%. If you open that account with a initial deposit of $2,000.00 and each month for now on you will save $300. What is the balance of the account after 5 years?.

Solution: Follow the next sequence:

Keystrokes	Description
[END]	Set the END mode.
"12" **[P/YR]**	Set the number of payments per year to 12.
"5" **[↴]** **[N]**	Stores the number of periodic payments. **N = 60.00** (months)
"4" **[I%YR]**	Stores the interest rate percent. **I%YR = 4.00**
"2000" **[+/-]** **[PV]**	Stores the loan amount with negative sign. **PV = -2,000.00** (Cash-Out)
"300" **[+/-]** **[PMT]**	Stores the payment with negative sign. **PMT = -300.00** (Cash-Out)
[FV]	Calculates the future value. **FV = 22,331.69** (Cash-In)

Amortization Menu

The RLM-17BX “TVM menu” allows you to see a complete Amortization Schedule of the current values stored in the **[I%YR]**, **[PV]** and **[PMT]** variables. The calculation allows to obtain the amount of the payment applied toward principal and toward interest from a single loan payment or from several payments at once. It also calculates the remaining balance of the loan after the payment amortizations are made.



Variable	Description
[◀]	Calculates the previous amortization schedule, which contains “#P” payments. The previous set of payments ends where the last starts.
[▶]	Calculates the next amortization schedule, which contains “#P” payments. The next set of payments starts where the previous set left off.
[#P]	Stores the number of payments to be amortized, and calculates schedule for that many payments.
[Table]	Opens a view showing the complete amortization schedule for all the periods.

Variable	Description
Interest = **Principal=** **Balance=**	Touching the Interest, Principal or Balance rows, the value is entered in the calculator

Example : Amortization Schedule

You can obtain a 30-year, $65,000 mortgage at 12.5% annual interest. This requires a monthly payment of $693.72 (at the end of each month). Find the amounts that would be applied to interest and to the principal from the first and second year's payments.

Solution: Follow the next sequence:

Keystrokes	Description
[END]	Set the END mode.
"12" **[P/YR]**	Set the number of payments per year to 12.
"12.5" **[I%YR]**	Stores the monthly interest rate percent. **I%YR = 12.5**
"650000" **[PV]**	Stores the loan amount. **PV = 65,000.00** (Cash-In)
"693.72" **[+/-]** **[PMT]**	Stores the payment with negative sign. **PMT = -693.72** (Cash-Out)
[Amortization]	Shows the amortization schedule menu.
"12" **[#P]**	Shows the 1st year result: Payments 1 - 12 **Interest** = -8,113.16 **Principal** = -211.48 **Balance** = 64,788.52
[▶]	Shows the 2nd year result: Payments 13 - 24 **Interest** = -8,085.15 **Principal** = -239.49 **Balance** = 64,549.03

To visualize the complete loan schedule from the first to the last payment, touch the **[Table]** button.