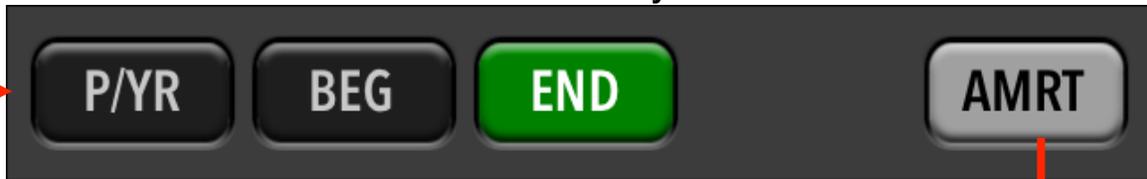


# TVM Menu: Time Value of Money Calculations

TMV primary menu



TMV secondary menu



TMV Amortization menu



The RLM-19BII TVM menu calculates Compound Interest problems involving money earning interest over a period of time. It is specially suited for loans, savings, mortgages or leasing calculations.

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

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

where  $i' = I\%YR / (P/YR \cdot 100)$ ;  $n = N \times P/YR$

Any of the , , ,  or  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.

Variable	Description
	Stores or calculates the total number of payments or compounding periods. "N" can be expressed in any unit of time. If   key is pressed, the number in the display is multiplied by "P/YR" and stored in "N".
	Stores or calculates the nominal annual interest rate in percent. If   key is pressed, the number in the display is divided by "P/YR" and stored in "I%YR".
	Stores or calculates the Present value of the series of future "PMT" amounts. "PV" always occurs at the beginning of the first period.
	Stores or calculates the the amount of each periodic payment. "PMT" can occur at the beginning or end of each period.
	Stores or calculates the Future value of the series of previous "PMT" amounts. "FV" always occurs at the end of the last period.
	Shows the TVM secondary menu to set the payment mode and input the number of compounding periods per year.
	Stores the number of payments or compounding periods per year. The value must be a positive integer from 1 to 999.
	Sets Begin mode; used when payments occur at the beginning of each period. In the TVM equation sets "S" equal to 1.
	Sets End mode; used when payments occur at the end of each period. In the TVM equation sets "S" equal to 0.
	Shows the Amortization menu for calculating amortization schedules.

## Cash Flow Sign Convention

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

### Clearing the TVM Variables ( )

If the RLM-19BII is displaying the primary TVM menu, all the TVM variables are set to 0. If the TVM secondary menu is displayed, the P/YR value is set to 12 and the mode is set to “END”.

### Example : Calculating

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:** First set **P/YR** to 12 and **END** mode in the secondary menu, then follow the next sequence in the primary menu:

 	Clears the TVM menu variables.
6.7 	Stores the interest rate per year in percent. <b>I%YR = 6.7</b>
25000 	Stores the loan amount. <b>PV = 25,000.00</b> (Cash-In)
500  	Stores the periodic payment. <b>PMT = -500.00</b> (Cash-Out)
	Calculates the number of payments required. <b>N = 58.79</b>

### 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:** First set **P/YR** to 4 and **END** mode in the secondary menu, then follow the next sequence in the primary menu:

	Clears the TVM menu variables.
8 	Stores the number of periodic payments. <b>N = 32.00</b> (quarters)
6000  	Stores the negative loan amount. <b>PV = -6,000.00</b> (Cash-Out)
10000 	Stores the future value of the investment. <b>FV = 10,000.00</b> (Cash-In)
	Calculates the quarterly interest rate percent. <b>I%YR = 6.44</b> (% per quarter)

### Example : Calculating

**PV**

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

**Solution:** First set **P/YR** to 12 and **END** mode in the secondary menu, then follow the next sequence in the primary menu:

	Clears the TVM menu variables.
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5	 	Stores the number of periodic payments. <b>N = 60.00</b> (months)
15		Store the interest rate percent per year. <b>I%YR = 15.00</b>
1230		Stores the monthly payments. <b>PMT = 1,230.00</b> (Cash-In)
10000		Stores the selling price. <b>FV = 10,000.00</b> (Cash-In)
		Calculate the present value. <b>PV = -56,448.22</b> (Cash-Out)

### Example : Calculating

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

**Solution:** First set **P/YR** to 12 and **END** mode in the secondary menu, then follow the next sequence in the primary menu:

	 	Clears the TVM menu variables.
25	 	Stores the number of periodic payments. <b>N = 300.00</b> (months)
5.25		Stores the monthly interest rate percent. <b>I%YR = 5.25</b> (% per year)
89560		Stores the mortgage amount. <b>PV = 89,560.00</b> (Cash-In)
		Calculates the periodic payment. <b>PMT = -536.69</b> (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:** First set **P/YR** to 12 and **END** mode in the secondary menu, then follow the next sequence in the primary menu:

Keystrokes	Description
 	Clears the TVM menu variables.
5  	Stores the number of periodic payments. <b>N = 60.00</b> (months)
4 	Stores the monthly interest rate percent. <b>I%YR = 4.00</b>
2000  	Stores the loan amount with negative sign. <b>PV = -2,000.00</b> (Cash-Out)
300  	Stores the payment with negative sign. <b>PMT = -300.00</b> (Cash-Out)
	Calculates the future value. <b>FV = 22,331.69</b> (Cash-In)

## Amortization Menu



The RLM-19BII TVM menu allows you to calculate 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.

Button	Description
<b>#P</b>	Stores the number of payments to be amortized at once, and calculates the amortization schedule.
<b>INT</b>	Calculates the amount of the payments applied toward interest.
<b>PRIN</b>	Calculates the amount of the payments applied toward principal.
<b>BAL</b>	Calculates the balance of the loan.
<b>NEXT</b>	Calculates the amortization schedule for the next set of payments, using the stored value of “#P”.
<b>TABLE</b>	Shows the complete Amortization Schedule.

## Example : Amortization Schedule

You can obtain a 25-year mortgage for \$250,000 at 5.25% annual interest. This requires payments of \$1,498.12 (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:** First set **P/YR** to 12 and **END** mode in the secondary menu, then follow the next sequence in the primary menu:

Keystrokes	Description
 	Clears the TVM menu variables.
5.25 	Stores the annual interest rate percent. <b>I%YR = 5.25</b>
250000 	Stores the loan amount. <b>PV = 250,000.00</b> (Cash-In)
1498.12  	Type the monthly payments and store it in "PMT" (Cash-Out). <b>PMT = -1,498.12</b>
	Shows the Amortization Menu
12 	Calculates de Amortization Schedule: PAYMENTS: 1 - 12 PRINCIPAL = -4,970.91 BALANCE = 245,029.09 <b>INTEREST = -13,006.53</b>
	Calculates de Amortization Schedule: PAYMENTS: 13 - 24 PRINCIPAL = -5,238.26 BALANCE = 239,790.83 <b>INTEREST = -12,739.18</b>

To see the complete Amortization Schedule in a scrollable list touch the **TABLE** button. The following view will show up :

Amortization Schedule	
<b>Payments: 1 - 12</b>	
Interest =	-13,006.53
Principal =	-4,970.91
Balance =	245,029.09
<b>Payments: 13 - 24</b>	
Interest =	-12,739.18
Principal =	-5,238.26
Balance =	239,790.83
<b>Payments: 25 - 36</b>	
Interest =	-12,457.47
Principal =	-5,519.97
Balance =	234,270.86
<b>Payments: 37 - 48</b>	
Interest =	-12,160.58
Principal =	-5,816.86
Balance =	228,454.00

**Copy**   **Mail**   **Print**   **Close**

Button	Description
 A dark grey rounded rectangular button with the word "Copy" in white text.	Copies the complete amortization schedule in a tab delimited text list.
 A dark grey rounded rectangular button with the word "Mail" in white text.	Open a mail composer to send the amortization schedule by email.
 A dark grey rounded rectangular button with the word "Print" in white text.	Shows the AirPrint view to print the amortization schedule in available printers if any.
 A yellow rounded rectangular button with the word "Close" in black text.	Close the amortization schedule view.