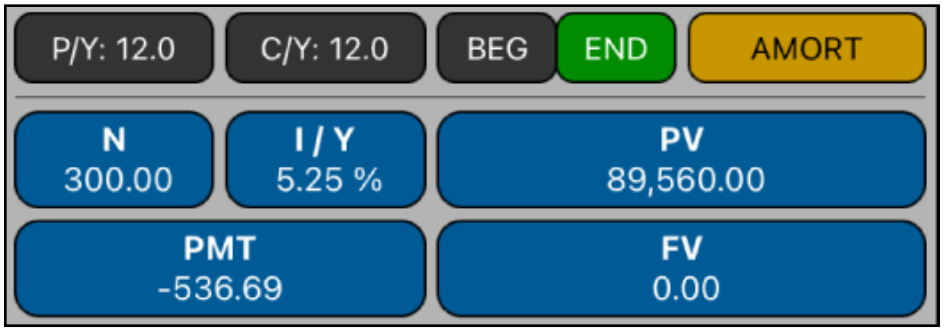
Time Value of Money Worksheet



The "Time-Value-of-Money" (TVM) worksheet calculates Compound Interest problems involving money earning interest over a period of time. It is specially suited for loans, savings, mortgages and leasing calculations.

Time Value of Money Menu Actions	
[P / Y] **[C / Y]**	Stores the number of payments per year. Stores the number compounding periods per year.
[BEG] [END]	Sets the mode for payments at the beginning or end of each period.
[N]	Stores or calculates the number of compounding periods.
[I / Y]	Stores or calculates the nominal interest rate per year in %.
[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 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.
[AMORT]	Shows the **Amortization Worksheet** for calculating the amount of payment applied to interest & principal for a given periods.
If any other key is pressed before one of the **Blue** keys, the displayed number is stored in the corresponding variable. Otherwise, the variable is calculated.	

The blue 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:

$$i = (1 + I/Y \div C/Y) \div 100)^{(C/Y \div P/Y)}$$

S = 1 for **BEG** mode and 0 for **END** mode.

Any of the **N**, **I / Y**, **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 sign of the **PV**, **PMT** or **FV** variable must follow the "**Cash Flow Convention**". 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: Follow the next sequence:

[END]	Set the END payment mode.
12 **[P/Y]**	Set the number of payments per year to 12.
6.7 **[I / Y]**	Stores the interest rate percent. **I / Y = 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)
0 **[FV]**	Reset FV to 0.
[N]	Calculates the number of payments required. **N = 58.79** (months)

Example : Calculating [I / Y]

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:

[END]	Set the END payment mode.
4 **[P/Y]**	Set the number of payments per year to 4.
32 **[N]**	Stores the number of periodic payments. **N = 32.00** (quarters)

0 [PMT]	Reset PMT to 0.
-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 / Y]	Calculates the quarterly interest rate percent. **I / Y = 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 payment mode.
12 **[P/Y]**	Set the number of payments per year to 12.
60 [N]	Stores the number of periodic payments. **N = 60.00** (months)
15 [I / Y]	Stores the interest rate percent. **I / Y = 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]	Set the END mode & clear future value
12 **[P/Y]**	Set the number of payments per year to 12.
300 [N]	Stores the number of periodic payments. **N = 300.00** (months)
5.25 [I / Y]	Stores the interest rate percent. **I / Y = 5.25**
89560 [PV]	Stores the mortgage amount. **PV = 89,560.00** (Cash-In)
0 [FV]	Reset the future value to 0.
[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 an 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 payment mode.
12 **[P/Y]**	Set the number of payments per year to 12.
60 **[N]**	Stores the number of periodic payments. **N = 60.00** (months)
4 **[I / Y]**	Stores the interest rate percent. **I / Y = 4.00**
-2000 **[PV]**	Stores the loan amount. **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)