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Using the TVM Solver

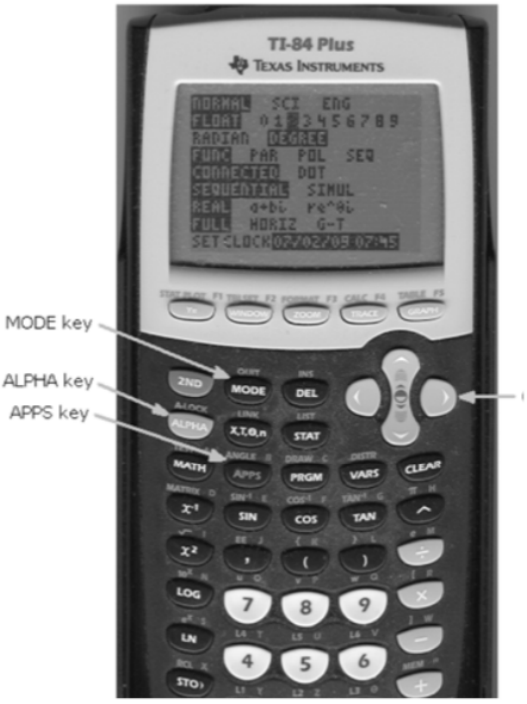
A Time Value of Money (TVM) Solver is a program used to Perform Financial Calculations.

1. Turn on your calculator.

2. Since you are dealing with money, two decimal places are appropriate.

Press the **MODE** key.
Cursor down one, and right three, to select 2 decimals places.
Press **ENTER**.

The results of all calculations will now be displayed with two decimal places.



3. **a)** Press the **APPS** key.
The applications list will appear:

```
APPLICATIONS
1:Finance…
2:ALG1CH5
3:ALG1PRT1
4:CabriJr
5:CBL/CBR
```

b) Select 1: Finance… by pressing **ENTER**
The TVM solver menu will appear:

```
CALC VARS
1:TVM Solver…
2:tvm_Pmt
3:tvm_I%
4:tvm_PV
5:tvm_N
```

c) Press **ENTER** to select the TVM solver. There may be some numbers left in the TVM solver from a previous user. Just replace these numbers with yours.

4. What do all the variables mean?

N = total number of payments (# of years x # of times compounded)
I% = interest rate as a percent (★DO NOT CONVERT TO A DECIMAL★)
PV = present value or principal
PMT = amount of each payment (use ZERO since no additional payments other than the original one)
FV = future value
P/Y = payments per year (use same number as C/Y even though there is only one original payment)
C/Y = compounding periods per year
PMT: END BEGIN to select when payments are made → ALWAYS USE END

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CALCULATING ON THE TVM SOLVER

Example 1

Esteban and Suzanne want to take their sons on a vacation to Florida in 1 year. They invest $2000 in a Bond that pays 6% interest per year, compounded monthly. How much money will they have for their trip?

Use the cursor keys and number keys to enter the numbers where they belong.

N = 12 ← *it is invested for 1 year x compounded 12 times*
I% = 6 ← *interest rate is 6%/year*
PV = 2000 ← *the amount invested (principal)*
PMT = 0 ← *always use for zero for single deposits*
FV = _____ ← *the amount at the end of the investment*
P/Y = 12 ← *same number as below*
C/Y = 12 ← *since it is compounded monthly, there are 12 compounding periods per year*

To solve (find the payment),

i. *scroll up to FV*
ii. *press **ALPHA**, and then **ENTER***

Notice that the payment is negative.
The TVM Solver distinguishes between money received (+) and money given (-). The negative value makes sense since each payment is money that Esteban and Suzanne give up.

∴ Esteban and Suzanne will have $2123.36 in one year.

When using the TVM Solver:

- *PV is negative because you pay money out when you invest a principal*
- *FV is positive because you receive money when an investment matures*

Example 2

Tatiana wants to buy a surround-sound system for her TV. It costs $1100. Her account pays 1.8% interest per year, compounded monthly. How long will it take her save enough money? She has $700 in her account right now.

N= Alpha Enter
I%= 1.8
PV= -700
PMT= 0
FV= 1100
P/Y= 12
C/Y= 12

$n = 301.5$
$12t = 301.5$
$t = 25$ yrs

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The Effects of Changing Conditions on Loans & Investments

INVESTIGATE:

Use the TVM Solver to investigate each of the following.

1. CHANGING THE TERM

Principal (PV)	Interest Rate (I%)	Length of Investment (N)	Compounding Period (C/Y)	Amount (FV)	Total Interest (FV − PV)
i. $10 000	4.5%	5 years	12	12 517.96	2 517.96
ii. $10 000	4.5%	10 years	12	15 669.93	5 669.93
iii. $10 000	4.5%	20 years	12	24 554.66	14 554.66
iv. $10 000	4.5%	25 years	12	30 737.43	20 737.43

a. How does changing the term affect an investment? Explain.

The longer the investment the more interest can grow on it.

2. CHANGING THE INTEREST RATE

Principal (PV)	Interest Rate (I%)	Length of Investment (N)	Compounding Period (C/Y)	Amount (FV)	Total Interest (FV − PV)
i. $10 000	3.5%	10 years	12	14183.45	4183.45
ii. $10 000	4.6%	10 years	12	15826.82	5826.82
iii. $10 000	7.5%	10 years	12	21 120.65	11120.65
iv. $10 000	9.4%	10 years	12	25 506.23	15 506.23

a. How does changing the interest rate affect an investment? Explain.

The bigger the interest rate the more interest gets accumulate.

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3. Changing The Compounding Period

	Principal (PV)	Interest Rate (I%)	Length of Investment (N)	Compounding Period (C/Y)	Amount (FV)	Total Interest (FV − PV)
v.	$10 000	5%	10 years	2	16 386.16	6386.16
vi.	$10 000	5%	10 years	4	16 436.19	6436.19
vii.	$10 000	5%	10 years	12	16 470.09	6470.09
viii.	$10 000	5%	10 years	24	16 478.64	6478.64

a. How does changing the compounding period affect an investment? Explain.

The more frequently an investment is compounded the more interest is accumulated.

4. Summary

a. What conditions would be best when investing money? Why?

- Bigger interest rate
- more frequent compounding
- leave it alone for a long time

} to get more interest

b. How would changing these same conditions (length of loan/ investment, interest rate and compounding period) affect a loan?

They will affect a loan in the same way, however for a loan you want the opposite conditions to get charged less interest