



Finance on the TI-Nspire CAS



You purchase an apartment for \$200 000, pay 30% deposit, and mortgage the balance. You amortize your debt with monthly repayments for 30 years.

- a. What is your monthly payment if your interest rate for the loan is 7.5% compounded monthly?
- b. Create an amortization table for this particular example. i.e. a table that shows the relationship between interest paid versus principal paid at each payment cycle.

Note: Amortization examples generally refer to a Future Value (FV) of \$0. i.e. fully repaid and all defaults will relate to this fact. You can, however, have any value as the FV and override the default values accordingly.

Solution

- a. Use TVM (Finance Solver). Access in Calculator application under the Finance tab. Enter values. Use TAB to move between entry fields. Move to Pmt and press Enter to solve. The payment in this case will be \$978.90 (rounded)

- b. From the Finance tab, select Amortization Table. This will paste the command to the Calculator screen (also available from Catalog with syntax shown opposite)

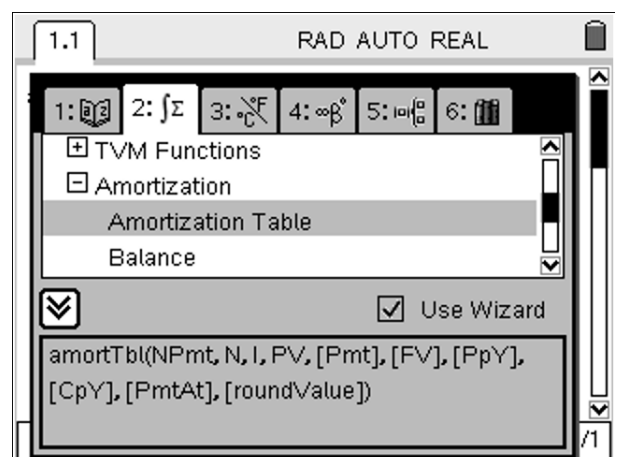
The syntax refers to:

NPmt - the number of payments you want displayed on the screen, starting from the first payment (the example shows 30. You could show the whole 360 but that would be a little messy!)

I - the Interest rate i.e. 7.5%

N - the total number of repayments i.e. 360

PV - the Present Value (i.e. value of the loan) i.e. \$140 000



Pmt - the payment is auto calculated using $Pmt = \text{tvmPmt}(N, I, PV, FV, PpY, CpY, PmtAt)$ based on other input values. You can also enter this value manually if given, or previously calculated (make sure you enter as -ve).

FV - the future value – by default this is zero (loan fully discharged). In this example it is zero so you can leave it out, enter zero if preferred.

PpY and Cpy - the payments and compounds per year. These must be entered if not the default value of 1. In this example it is monthly hence 12.

PmtAt is default **End** which is what you want in this example. You can leave it out, type it in, or paste from the variable list.

roundValue – rounds the display (default 2). You can ignore this and leave as the default or type in 2 or 0 if you want integer values.

0	0.	0.	140000.
1	-875.	-103.9	139896.
2	-874.35	-104.55	139792.
3	-873.7	-105.2	139686.
4	-873.04	-105.86	139580.
5	-872.38	-106.52	139474.
6	-871.71	-107.19	139367.

Note that Ppy and CpY occur after some optional inputs (if you do not enter values in these optional fields then commas must still be used as space holders if Ppy and CpY have values other than the default value of 1! If optional inputs occur at the end, then no provision for space holding is required.

** If you use Finance Solver (TVM Solver) first all the variables except NPmt and round are stored and can be accessed from the key.

Hence:

`amortTbl(30,360,7.5,140000,optional,optional,12,12,optional,optional)`

then becomes:

`amortTbl(30,360,7.5,140000,,,12,12)`

alternatively fill in all the default values.

What do the columns represent?

Column 1 is the number of the repayment

Column 2 is the amount of interest paid off in that repayment period.

Column 3 is the amount of principal paid off in that repayment period.

Column 4 is the balance of the loan at the end of each payment period.

Is there another way to get an Amortization table?

Spreadsheets (in Lists & Spreadsheet application) can be set up to calculate such examples and can be easily edited to adjust input values. Just go to the cell and edit the inputs (i.e. Amount, Interest etc.). You can also plot Principal payment and Interest payment over time.

One such “program” can be found at: http://www.johnhanna.us/nspire/tns_files/Loans.tns

This program assumes **monthly** payments.

A modified version of the above file (LoansBN.tns) is included on the Activities Exchange with this document that allows you to change to any payment & compounding period.

1	Amount	140000	P/Year	12	
2	Interest%	7.5	C/Year	12	
3	Periods	360			
4	Payment:	978.9	352404.	=TOTAL	
5					
6	PmtNum	PmtAmt	PrincPmt...	IntPmt	Balance
7	1	978.9	103.9	875.	139896.
8	2	978.9	104.55	874.35	139792.
9	3	978.9	105.2	873.7	139686.
10	4	978.9	105.86	873.04	139580.
11	5	978.9	106.52	872.38	139474.
12	6	978.9	107.19	871.71	139367.

This gives repayment value (without having to use Finance Solver) and total value repaid.

You edit cells B1, B2, B3, D1 & D2 to suit the problem.

A graph of the amount of interest and principal paid at each payment period for 108 pay periods (9 years) is shown. To plot, you must have the values starting in the first row of each column.

