EXPLORATIONS

CHAPTER 10

When using the TI-83 Plus or TI-84 Plus calculators you access ***Finance*** by pressing the APPS key.

Amortization Tables

Amortization is paying back a debt at regular time intervals with equal payments.

A table which indicates principal payments, interest payments, and the balance on a loan for each time interval is called the amortization table.

Calculator Housekeeping Detail

When the **TVM Solver** is used, a number of financial variables are set and available for use in other financial calculations. The functions **ΣInt(A,B)**, **ΣPrn(C,D)** and **bal(X)**, use the stored values PV, I%, and PMT from the **TVM Solver**.

ΣInt(A,B) calculates the sum of the interest from period A through period B. For example, **ΣInt(1,12)** calculates the sum of the interest for the months 1 through 12.

ΣInt(2,2) would be the interest for the second period.

Other functions which operate in a similar manner include **ΣPrn(A,B)** and **bal(X)**. The **ΣPrn(C,D)** computes the sum of the principal from period C through period D. The command **bal(X)** computes the balance for the amortization table for period X.

Constructing an Amortization Table

Example 1:
You purchase a house for $100,000, pay 20% down, and mortgage the balance. You amortize your debt with monthly payments for 30 years. What is your monthly payment if your interest rate for the loan is 9% compounded monthly? Create an amortization table for this particular example.

Method 1: Using TABLES

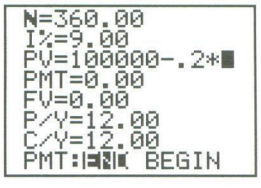
You can look at the amortization table by using Y_1, Y_2 and Y_3 to store the principal, payments and balance and then use the TABLE functions on the calculator.

Use the **TVM Solver** to find the monthly payment and to set the financial variables.

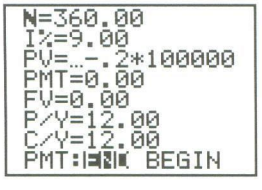
1. Press [2nd] [FINANCE] *(5A)*† and choose **1:TVM Solver**.
2. Enter the values as shown. For PV, enter 100000 [−] .2 [×] 100000. This represents the amount of the loan, $100,000, minus the 20% down payment. (Figures 1 and 2)

   Note: the ellipsis in Figure 2 following the equal sign indicates that part of the expression entered for PV is not displayed on the screen. Use the cursor keys, [▶] and [◀], to view the hidden parts of the expression.

(Figure 1)



(Figure 2)

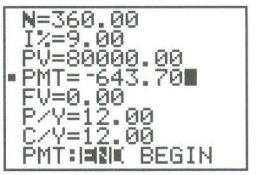


† **Refer to the section on Key Arrangement in Chapter 1 for an explanation of the key locator codes used in this manual.**

3. Move the cursor to PMT and press [ALPHA] [SOLVE] *(10E)*.

   The monthly payment is $643.70 (Figure 3)

(Figure 3)



Calculator Housekeeping Detail

Use of the **TVM Solver** has set variables that can be used by functions like **bal(X)**, **ΣInt(A,B)** and **ΣPrn(C,D)**.

Use the **bal(** command to find the balance after payments 1, 2 and 3.

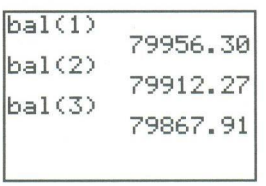
(Figure 4)

4. Press [2nd] [QUIT] *(2B)* to return to the Home Screen.

5. Press [2nd] [FINANCE] *(5A)* and choose **9:bal(** to paste the **bal(** command on the Home Screen. (Figure 4)

6. Enter the payment number and press [)] [ENTER] to find the balance after each payment. (Figure 5)

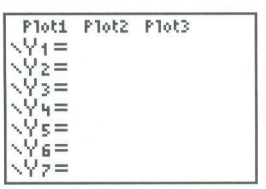
(Figure 5)



Creating the Tables

7. To create the tables, press the [Y=] key. (Figure 6)

(Figure 6)

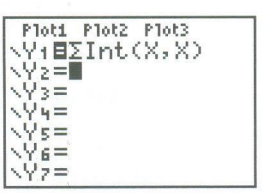


8. Press [2nd] [FINANCE] *(5A)* and choose **A:ΣInt(** to paste the interest function in $\mathbf{Y_1}$. (Figure 7)

(Figure 7)

9. Enter [X,T,Θ,n] [,] [X,T,Θ,n] [)] [ENTER] to complete the function. (Figure 8)

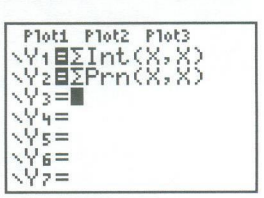
(Figure 8)



10. Store the principal balances in $\mathbf{Y_2}$. Move the cursor to $\mathbf{Y_2}$. Press [2nd] [FINANCE] *(5A)* and choose **0:ΣPrn(** from the CALC menu. Complete the command as in step 9 above. (Figures 9 and 10)

(Figure 9)

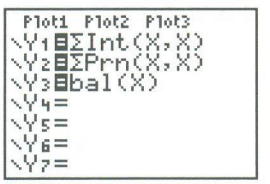
(Figure 10)



11. Store the balance in $\mathbf{Y_3}$. (Figures 11 and 12)

(Figure 11)

(Figure 12)

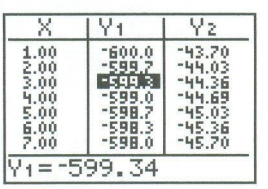


12. Before viewing the table, set the start value and the increment by pressing 2nd [TBLSET] *(1B)*. Set TblStart to 1 and ΔTbl to 1. (Figure 13)

(Figure 13)

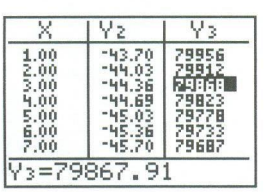
13. Press 2nd [TABLE] *(1E)* to view the table. (Figure 14)

(Figure 14)



14. Press the ▸ key to see the values in $\mathbf{Y_2}$ and $\mathbf{Y_3}$. Press the ▾ key to see values for the different months in the payment schedule. (Figure 15)

(Figure 15)



Example 2:
Find the payment needed each month for 1 year to pay off a debt of $1,000 at 12% compounded monthly. Show the amortization schedule.

Method 2: Using LISTS

(Figure 16)

1. Use the **TVM Solver** as in Method 1 to set the variables for later use in the lists.

   The payment per month is $88.85. (Figure 16)

2. To go to the home screen, press 2nd [QUIT] *(2B)*.

3. Press the STAT key *(3C)* and choose **5:SetUpEditor** from the EDIT menu. (Figure 17)

   This will paste SetUpEditor on the Home Screen.

(Figure 17)

4. Enter 2nd [L_1] *(9B)* , *(6B)* 2nd [L_2] *(9C)* , 2nd [L_3] *(9D)* , 2nd [L_4] *(8B)* , 2nd [L_5] *(8C)* ENTER *(10E)*.

   The calculator will respond **Done**. (Figure 18)

(Figure 18)

5. Press the [STAT] key *(3C)* and choose **4:ClrList** from the EDIT menu. (Figure 19)

   This will paste the **ClrList** command on the Home Screen.

(Figure 19)

6. Enter [2nd] [L_1] *(9B)* [,] *(6B)* [2nd] [L_2] *(9C)* [,] [2nd] [L_3] *(9D)* [,] [2nd] [L_4] *(8B)* [,] [2nd] [L_5] *(8C)* [ENTER] *(10E)*.

   The calculator will respond **Done**. (Figure 20)

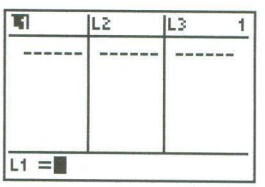
(Figure 20)

7. Press the [STAT] key *(3C)* and choose **1:Edit** from the EDIT menu. (Figure 21)

(Figure 21)

8. When the lists appear, move the cursor to the top of the column so that L_1 is highlighted and press [ENTER]. (Figure 22)

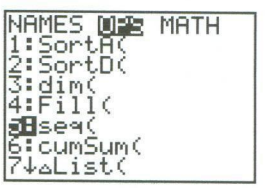
(Figure 22)



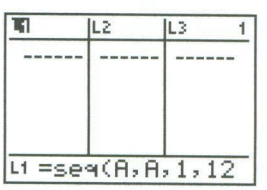
9. Enter **seq(A,A,1,12)** for L_1.

   The **seq(** command is located in the OPS menu of the [2nd] [LIST] key *(3C)*. The syntax for this command is **seq**(expression,variable,begin,end). (Figures 23 and 24)

(Figure 23)



(Figure 24)

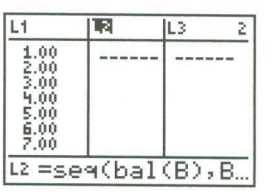


10. Highlight L_2 and press [ENTER].

    Enter **seq(bal(B),B,1,12)** in L_2. (Figure 25)

    The **bal(** command is located in the CALC menu of the [2nd] [FINANCE] key *(5A)*.

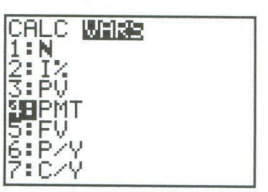
(Figure 25)



11. Highlight L_3 and press [ENTER].

    Enter **seq(∑Int(D,D),D,1,12)** for L_3. (Figure 26)

(Figure 26)

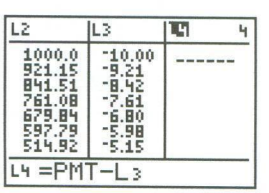


12. Highlight L_4 and press [ENTER].

    Enter **PMT - L_3** in L_4. (Figure 27)

    The PMT variable can be found in the VARS menu of the [2nd] [FINANCE] key *(5A)*.

(Figure 27)



13. L_1 through L_4 constitute the amortization table for this example. Use the cursor keys, ▶ and ◀, to explore the values. (Figure 28)

(Figure 28)

L2	L3	L4 4
1000.0	-10.00	-78.85
921.15	-9.21	-79.64
841.51	-8.42	-80.43
761.08	-7.61	-81.24
679.84	-6.80	-82.05
597.79	-5.98	-82.87
514.92	-5.15	-83.70

L4(3) = -80.428788...