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 $\Sigma Int(A,B)$, $\Sigma Prn(C,D)$ and $bal(X)$, use the stored values PV, I%, and PMT from the TVM Solver.

$\Sigma Int(A,B)$ calculates the sum of the interest from period A through period B. For example, $\Sigma Int(1,12)$ calculates the sum of the interest for the months 1 through 12.

$\Sigma Int(2,2)$ would be the interest for the second period.

Other functions which operate in a similar manner include $\Sigma Prn(A,B)$ and $bal(X)$. The $\Sigma Prn(C,D)$ 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 $\Box$.2 $\Box$ 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, $\Box$ and $\Box$, to view the hidden parts of the expression.

† 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)

Calculator Housekeeping Detail

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

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

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 [1] [ENTER] to find the balance after each
   payment. (Figure 5)

Creating the Tables

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

8. Press [2nd] [FINANCE] (5A) and choose A:ΣInt() to paste the interest function
   in Y1. (Figure 7)

9. Enter X,T,θ,n , X,T,θ,n 1 [ENTER] to complete the function. (Figure 8)

    [FINANCE] (5A) and choose 0:ΣPrtn() from the CALC menu. Complete the
    command as in step 9 above. (Figures 9 and 10)
11. Store the balance in \( Y_3 \). (Figures 11 and 12)

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

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

14. Press the \( \uparrow \) key to see the values in \( Y_2 \) and \( Y_3 \). Press the \( \downarrow \) key to see values for the different months in the payment schedule. (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
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.

4. Enter 2nd [L] (6B) \( L_1 \) (6B) 2nd [L] (6C) \( L_2 \) (6D) \( L_3 \) (6E)
   
   \( \bullet \) 2nd [L] (6C) \( L_3 \) (6E) \( L_3 \) (6E) ENTER (1E).
   
   The calculator will respond Done. (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.

6. Enter \[2nd\ L_1\ (9B)\] \[\begin{array}{c} (6B) \end{array}\] \[2nd\ L_1\ (9C)\] \[\begin{array}{c} 2nd\ L_2\ (9D)\end{array}\] \[2nd\ L_3\ (8B)\]
   \[\begin{array}{c} \text{2nd}\ L_3\ (8C)\ \text{ENTER}\ (1CE)\end{array}\]
   The calculator will respond Done. (Figure 20)

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

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)

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).

11. Highlight \(L_3\) and press [ENTER].
    Enter seq(\(\Sigma\)Int(D,D),D,1,12) for \(L_3\). (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).
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)

<table>
<thead>
<tr>
<th>( L_2 )</th>
<th>( L_3 )</th>
<th>( L_4 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000.0</td>
<td>10.00</td>
<td>78.85</td>
</tr>
<tr>
<td>921.15</td>
<td>9.21</td>
<td>78.66</td>
</tr>
<tr>
<td>841.51</td>
<td>8.42</td>
<td>78.46</td>
</tr>
<tr>
<td>761.08</td>
<td>7.64</td>
<td>78.26</td>
</tr>
<tr>
<td>681.84</td>
<td>6.86</td>
<td>78.06</td>
</tr>
<tr>
<td>601.78</td>
<td>6.08</td>
<td>77.87</td>
</tr>
<tr>
<td>521.92</td>
<td>5.19</td>
<td>77.67</td>
</tr>
<tr>
<td>442.24</td>
<td>4.30</td>
<td>77.47</td>
</tr>
<tr>
<td>( L(0) = -80.428788 )</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>