

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

## Loans & Mortgages

A loan is a contract that defines the terms for repayment of a sum of money lent at interest. A mortgage confers an interest in a property as security for repayment of a loan.

## Example 1:

What are the monthly payments to finance a \$12,000 car at 13% interest for 5 years?

- 1. Press 2nd [FINANCE] (5A)†. Choose 1:TVM Solver from the CALC menu.
- Enter N = 60, I% = 13, PV = 12000, FV = 0, P/Y = 12 and C/Y = 12.
   Note that N is 60 because there are 12 payments per year for five years. PMT is entered as a positive number because the \$12,000 is received from the finance company.
- 3. Press ALPHA [SOLVE] (10E). (Figure 1)

The payment, \$273.04, is negative because that is the amount paid to the finance company each month.

## Calculator Housekeeping Detail

When the TVM functions are used, a number of financial variables are set and available for use in other financial calculations.

 $\Sigma$ Int(A,B) calculates the total interest from period A through period B.  $\Sigma$ Int(1,12) calculates 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 command bal(X) gives the balance at period X.

*Example 1* indicates that \$273.04 must be paid monthly. An interesting question considers how much interest will be paid on the loan for the car. Use the  $\Sigma$ Int(1,60) command.

- 1. From the **TVM Solver** screen, press 2nd [QUIT] (2B) to go to the Home Screen.
- 2. Press 2nd [FINANCE] (5A) and choose **A:ΣInt**( from the CALC menu. (Figure 2)

(Figure 1)

(Figure 2)

VARS
57tvm\_N
6:tvm\_FV
7:npv(
8:irr(
9:bal(
0:ΣPrn(
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<sup>†</sup> Refer to the section on Key Arrangement in Chapter 1 for an explanation of the key locator codes used in this manual.

3. Complete the command by typing 1, 60 | ENTER. (Figure 3) (Figure 3)  $\Sigma Int(1,60)$ 4382.15 The amount \$4,382.15 is the interest that was paid over the five years. What was the principal that was repaid? It should be \$12,000. (Figure 4) 6: tum. The  $\Sigma Prn(1,60)$  command, found on the same menu as  $\Sigma Int$ , shows the total principal as \$12,000.25. (Figures 4 and 5) Note: The extra \$0.25 is the accumulated round off error in the payment. ΣPrn(1,60) -12000.25 (Figure 5) CALC WARE Multiply the payment (PMT) by 60 (the number of payments). The out-of-pocket (Figure 6) money for this \$12,000 loan for 5 years was \$16,382.21. (Figures 6 and 7) Some comments are appropriate as you review the numbers. Clearly the  $\Sigma$ Prn(1,60) should not be 12,000.25; however, the internal calculations were rounded to 2 places. (See TI-83 Graphing Calculator Guidebook, page 14-9.) ΣPrn(1,60,4) will round internal calculations to 4 places. Banks usually round internal calculations to 3 decimal 60\*PMT (Figure 7) places. -16382.21 Example 2: (Figure 8) What is the highest priced car that a young professional can afford if she is willing to pay monthly car payments of \$350 for the next 5 years with the interest rate at 12%?

She can buy a car costing \$15,734.26. (Figure 8)