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.

2. 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.

ΣInt(A,B) calculates the total interest from period A through period B. ΣInt(1,12) calculates 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 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 ΣInt(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)

† 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 \[ 60 \] \[ \text{ENTER} \]. (Figure 3)
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.

The \( \Sigma \text{Prn}(1,60) \) command, found on the same menu as \( \Sigma \text{Int} \), 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.

Multiply the payment (PMT) by 60 (the number of payments). The out-of-pocket 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 \( \Sigma \text{Prn}(1,60) \) should not be 12,000.25; however, the internal calculations were rounded to 2 places. (See *TI-83 Graphing Calculator Guidebook*, page 14-9.) \( \Sigma \text{Prn}(1,60,4) \) will round internal calculations to 4 places. Banks usually round internal calculations to 3 decimal places.

Example 2:
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)