

Loans and 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.

Objectives:

- Determine the monthly payment for a vehicle that is financed at a fixed interest rate for a certain amount of time.
- Given the monthly payment that can be paid over a certain amount of time at a fixed interest rate, determine the amount of money that can be borrowed.

Example 1:

What are the monthly payments to finance a \$18,000 car at 11% interest for 5 years?

1. Press **[apps]** and select **Finance**. Press **[enter]** to select **TVM Solver** from the CALC menu.

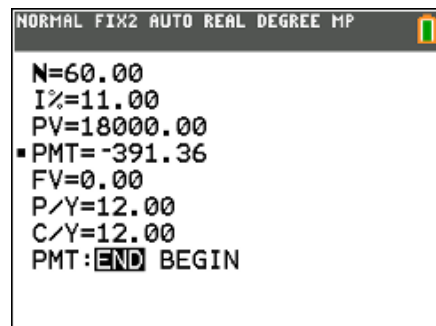
Note: The mode DECIMAL SETTING was changed to **FIX2** to round computations to two decimal places.

2. Enter N = 60, I% = 11, PV = 18000, FV = 0, P/Y = 12, and C/Y = 12.

Note that N is 60 because there are 12 payments per year for five years. PV is entered as a positive number because the \$18,000 is received from the finance company.

3. Place the cursor on PMT. Press **[alpha]** **[solve]**.

The payment, -391.36, 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.

$\Sigma\text{Int}(A,B)$ calculates the total interest from period A through period B. $\Sigma\text{Int}(1,12)$ calculates the interest for the months 1 through 12. $\Sigma\text{Int}(2,2)$ would be the interest for the second period.

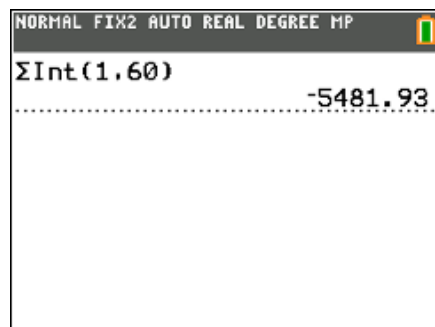
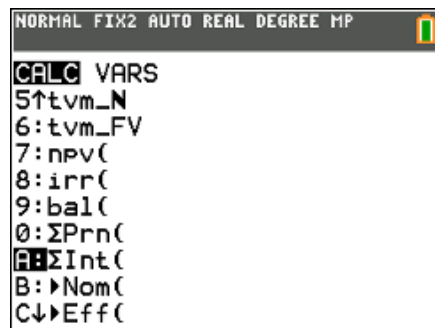
Other functions which operate in a similar manner include $\Sigma\text{Prn}(A,B)$ and **bal(X)**. The command **bal(X)** gives the balance at period X.

Example 1 indicates that \$391.36 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. Press **[2nd]** **[quit]** to return to the home screen.
2. Press **[apps]**, select **Finance**, and choose **ΣInt(** from the CALC menu.

3. Complete the command by typing 1 **[,]** 60 **)]** **[enter]**.

The amount \$5,481.93 is the interest that was paid over five years.

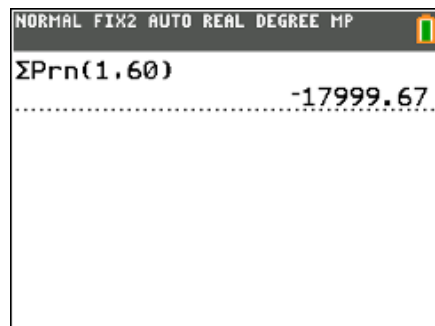


What was the principal that was repaid? It should be \$18,000.

The **ΣPrn(1,60)** command, found on the same menu as **ΣInt(**, shows the total principal as \$17,999.67.

Note: The difference of \$0.33 is the round off error in the payment.

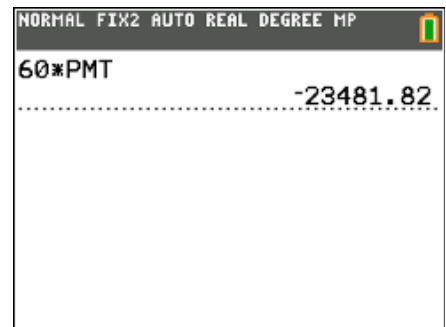
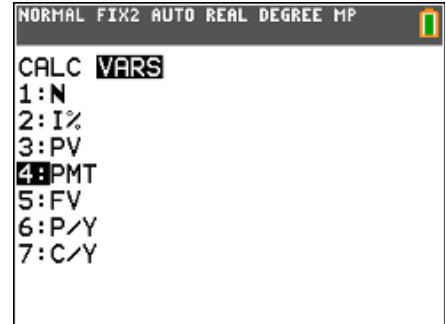
Some comments are appropriate regarding the calculated value of the total principal. Clearly the **ΣPrn(1,60)** should not be 17,999.67; however, the internal calculations were rounded to 2 places. **ΣPrn(1,60,4)** will round internal calculations to 4 places. Banks usually round internal calculations to 3 decimal places.





Multiply the payment (PMT) by 60 (the number of payments). The out-of-pocket money for this \$18,000 loan for 5 years was \$23,481.82.

Note: To select the payment (PMT), press **apps**, select **Finance**, and choose **PMT** from the VARS menu.



Example 2:

What is the highest priced car that a young professional can afford if she is willing to pay monthly car payments of \$450 for the next 7 years with the interest rate at 7.5%?

She can buy a car costing \$29,338.37.

