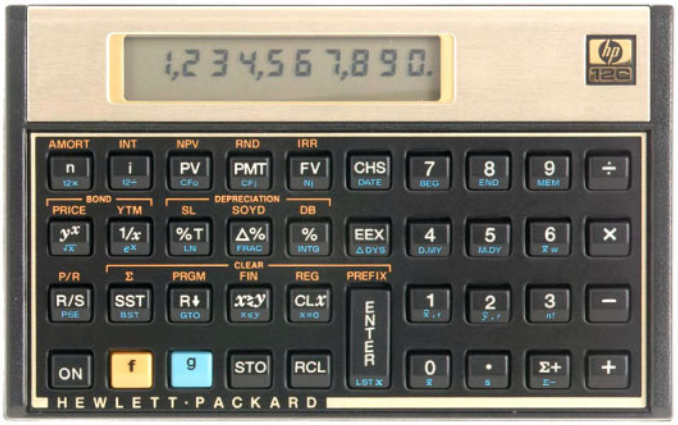
hp calculators



HP 12C Mortgage loan basics

Mortgage loan and TVM calculations

Cash flow diagrams and sign conventions

Practice solving mortgage loan problems

Mortgage loan and TVM calculations

A mortgage is a financial claim against real property. The mortgage itself defines several different combinations of legal documents usually needed to finance real estate. It is common to use the term 'mortgage loan' because the amount of money borrowed to buy the real state, a loan, is covered by a mortgage. The mortgage is then given to a lending institution as a personal promise that the borrower will repay the loan.

A set of mathematics tools has been developed with the purpose of evaluating the time value of money (TVM), and the concepts of present value of money (PV), future value of money (FV), periodic payments (PMT), interest rates (i), and the number of compouding periods (n). There are many standard situations where TVM calculations can be used to solve problems, like calculating loan and savings variables. The standard HP12C features designed to solve for unknown annuity or compound interest variables with the five TVM keys [n], [i], [PV], [PMT] and [FV] allow problems related to savings variables to be solved easily.

Cash flow diagrams and sign conventions

The regular use of cash flow diagrams leads to a faster approach to the solution in most TVM-related problems. The key is keeping the same viewpoint through each complete calculation. The sign conventions for cash flow in the HP12C follow the simple rule: money received is positive (arrow pointing up), money paid out is negative (arrow pointing down). The cash flow diagram below represents the borrower viewpoint of the most common savings calculations and their relation with the TVM variables.

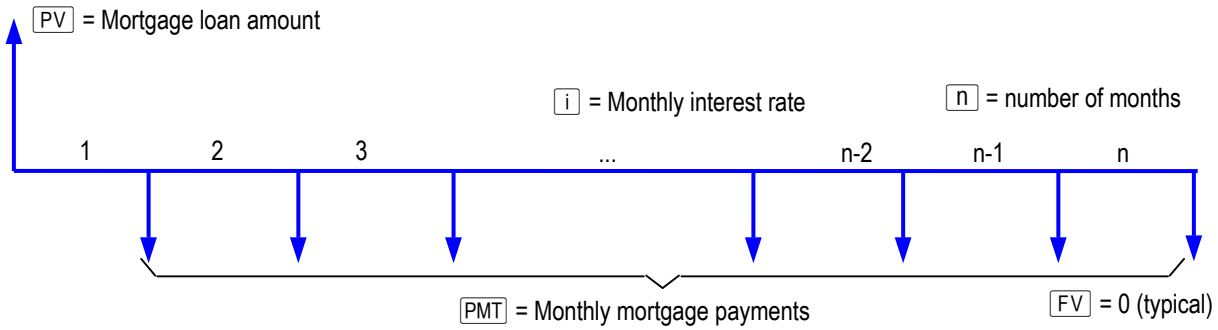


Figure 1

Setting up and/or calculating each of these values is a matter of using the HP12C TVM already existing features. There are also two functions meant to be an aid when entering or retrieving annual values for [n] and [i] : [12x] and [12÷]. Pressing [g][12x] is the same as pressing [ENTER][1][2][x][n], meaning the number of years can be keyed in and stored as number of months automatically. Pressing [g][12÷] is the same as pressing [ENTER][1][2][÷][i], meaning the yearly interest rate can be keyed in and stored as monthly interest rate automatically. It is also possible to retrieve the yearly-related values by pressing [RCL][g][12x] (number of years) and/or [RCL][g][12÷] (yearly interest rate) whenever necessary.

Practice solving mortgage loan problems

Example 1: A 30-year mortgage loan is settled to buy a home rated $114,400. The bank quoted an annual interest rate of 8.75%. What is the amount of each monthly payment with these figures? The diagram in Figure 2 illustrates this situation.

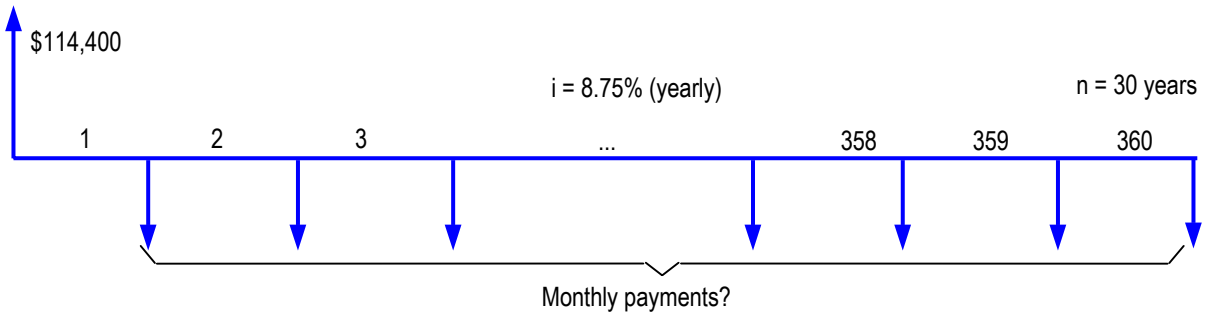


Figure 2

Solution: Enter the relevant values in any order and calculate the PMT:

8 • 7 5 g 12÷ 3 0 g 12x 1 1 4 4 0 0 PV 0 FV PMT

Figure 3

Answer: The amount of the monthly payment is $899.99.

Example 2: A family needs to buy a house and expects to pay no more than $1,000 monthly. A 25-year mortgage loan is secured at an annual interest rate of 6.75% compounded monthly. What is the maximum amount this family can of this loan the family can afford and still have a $1,000 monthly payment??

Solution: Enter the relevant values in any order and calculate PV:

6 • 7 5 g 12÷ 2 5 g 12x 1 0 0 0 CHS PMT 0 FV PV

Figure 4

Answer: The family can now search for a $144,736.33 house with this loan.

Example 3: The family from previous example found a beautiful house for $135,500 and wants to calculate the monthly payment using the same 25-year mortgage at 6.75%, compounded monthly.

Solution: Assuming that all previous data is kept in the calculator, enter the new present value and calculate the monthly payment again:

1 3 5 5 0 0 PV PMT

Figure 5

Answer: The new monthly payment is $936.19.