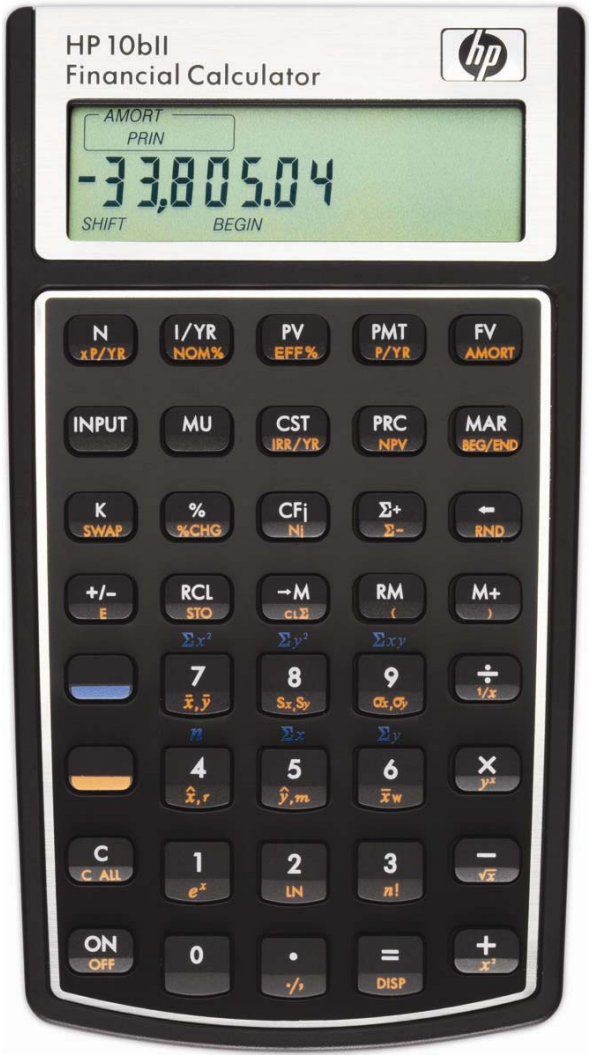
hp calculators



HP 10BII Mortgages with balloon payments

The time value of money application

Cash flow diagrams and sign conventions

Practice solving mortgage problems with balloon payments

The time value of money application

The time value of money application built into the HP 10BII is used to solve annuities that involve regular, uniform payments. Annuity problems require the input of 4 of these 5 values: [N] [I/YR] [PV] [PMT] [FV] . Once these values have been entered in any order, the unknown value can be computed by pressing the key for the unknown value.

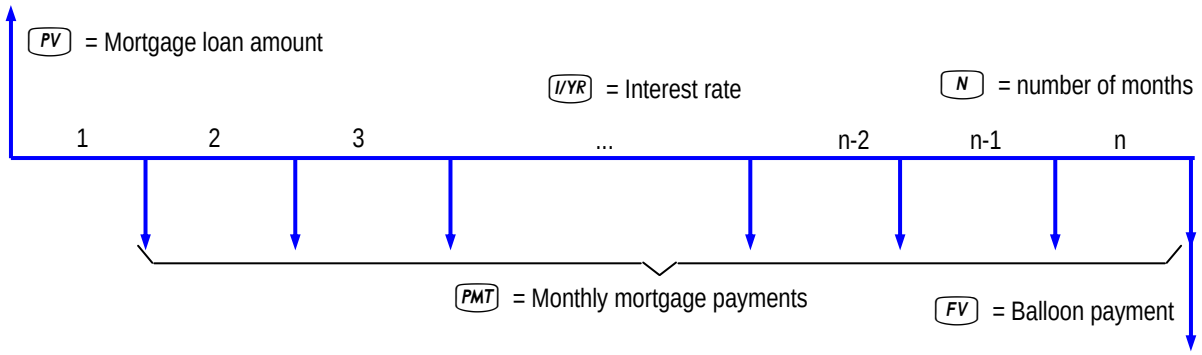
The time value of money application operates on the convention that money invested is considered positive and money withdrawn is considered negative. In a compound interest problem, for example, if a positive value is input for the [PV] , then a computed [FV] will be displayed as a negative number. In an annuity problem, of the three monetary variables, at least one must be of a different sign than the other two. For example, if the [PV] and [PMT] are positive, then the [FV] will be negative. If the [PV] and [FV] are both negative, then the [PMT] must be positive. An analysis of the monetary situation should indicate which values are being invested and which values are being withdrawn. This will determine which are entered as positive values and which are entered as negative values. Interest rates are always entered as the number is written in front of the percent sign, i.e., 5% is entered as a 5 rather than as 0.05.

The number of periods per year is set using the yellow-shifted [P/YR] function. Problems involving annual compounding or annual payments should be solved with this value set to 1. Problems involving monthly compounding or monthly payments should be solved with this value set to 12. To set this value to 4 for quarterly payments / quarterly compounding, for example, you would press [4] [▼] [P/YR] .

Additional information can be found in the learning module covering time value of money basics.

Cash flow diagrams and sign conventions

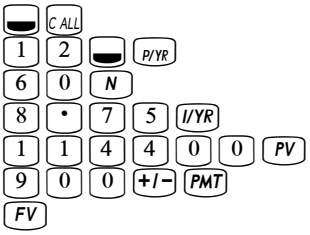
The sign conventions for cash flows in the HP 10BII follow the simple rule: money received is positive (arrow pointing up), money paid out is negative (arrow pointing down). The key is keeping the same viewpoint through each complete calculation. The regular use of cash flow diagrams allows a faster approach to the solution in most TVM-related problems. The cash flow diagram below represents the borrower viewpoint of the most common mortgage problems with fees and their relationship with the TVM variables.



Practice solving mortgage problems with balloon payments

Example 1: A home priced at $114,400 is bought with a mortgage with a $900 monthly payment for the next 30 years. The bank quoted an interest rate of 8.75%. If after five years the house must be sold, what is the amount still owed on the house?

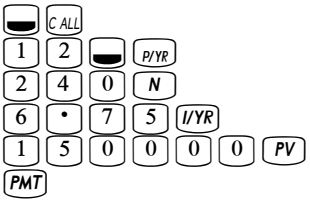
Solution:



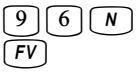
Answer: After five years, a balloon payment of $109,467.03 must be made to bank.

Example 2: A $150,000 house is bought with a 20-year mortgage loan having an annual interest rate of 6.75%, compounded monthly. After eight years the family needs to move to another state and the house must be sold. If they were to pay off the remaining balance on the loan, what would the final balloon payment be?

Solution: The regular payment for the 20-year original mortgage plan must be calculated first:



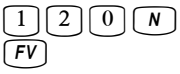
The monthly payment is $-1,140.55. Then enter the elapsed time and calculate the balloon payment.



Answer: The final amount owed on the loan, which is a balloon payment, is $-112,357.70.

Example 3: The family from previous example was informed (in time) that they would not need to move for two more years. What would the balloon payment be at that time with this unexpected change?

Solution: Assuming that all previous data is kept in the calculator, simply enter the new period and calculate the balloon payment again:



Answer: The balloon payment will then be $99,329.83 after ten years.