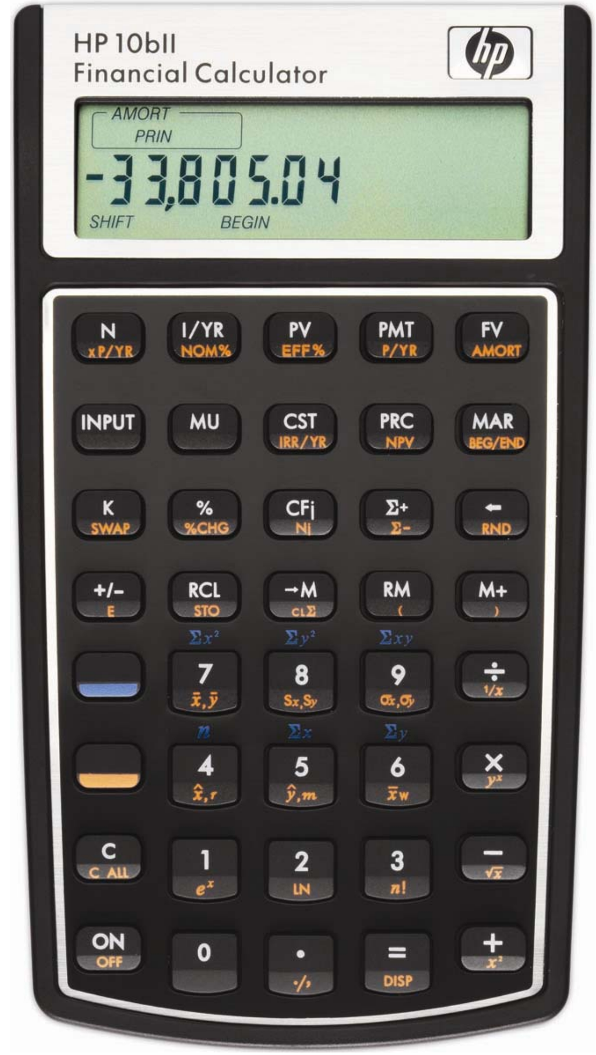
hp calculators

HP 10BII Solving for loan payments

The time value of money application

Loan payments

Practice solving for loan 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The time value of money application operates on the convention that money invested is considered positive and money withdrawn is considered negative.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 An analysis of the monetary situation should indicate which values are being invested and which values are being withdrawn.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.

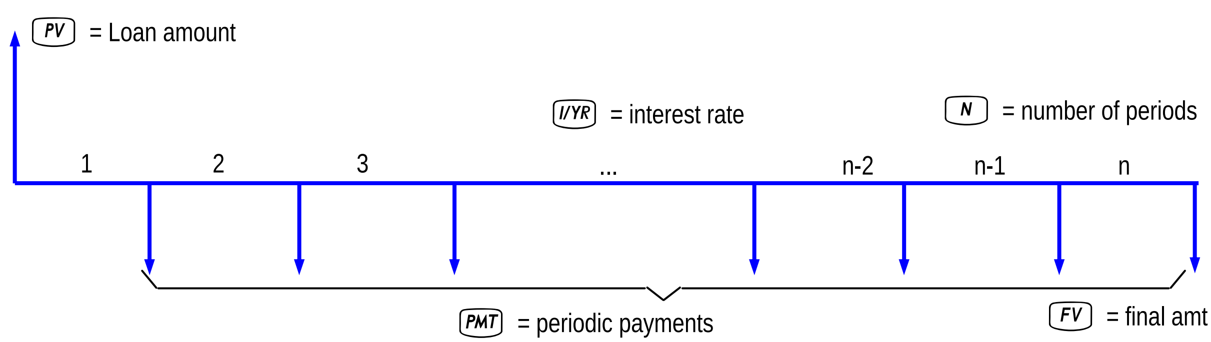
The number of periods per year is set using the yellow-shifted P/YR function. Problems involving annual compounding or annual payments should be solved with this value set to 1. Problems involving monthly compounding or monthly payments should be solved with this value set to 12. To set this value to 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.

Loan payments

Nearly everyone makes loan payments at one time or another, since few of us are able to always pay cash for houses and cars. Loan payments are computed so that part of the payment made pays for interest that has accrued on the loan since the last payment and part goes toward reducing the outstanding loan balance. Over the life of the loan, the portion of each payment that goes toward interest and the outstanding loan balance (or principal) changes, with the portion of each payment going toward principal increasing throughout the lifetime of the loan. This aspect of a loan is explained in greater detail in the learning module on loan amortizations.

Cash flow diagrams and sign conventions

The sign conventions for cash flows in the HP 10BII follow this 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 solve most TVM-related problems. The cash flow diagram below represents the borrower viewpoint of the most problems and their relationship to the TVM variables.



Practice solving for loan payments

Example 1: Johnny wants to buy a house that costs $180,000 and pay for it with a 30-year loan at 6% interest, compounded monthly. What is the size of Johnny's monthly house payment?

Solution:
[■] [C ALL]
[1] [2] [■] [P/YR]
[3] [6] [0] [N]
[6] [I/YR]
[1] [8] [0] [0] [0] [0] [PV]
[PMT]

Answer: $-1,079.19.

Example 2: Sarah is considering buying a car that costs $24,995. The terms she has been offered are a 36-month loan at 4.9%. What would be the size of her monthly car payment?

Solution:
[■] [C ALL]
[1] [2] [■] [P/YR]
[3] [6] [N]
[4] [•] [9] [I/YR]
[2] [4] [9] [9] [5] [PV]
[PMT]

Answer: $-748 per month. Sarah might want to see if there are less strenuous alternatives.

Example 3: Sarah is considering buying a car that costs $24,995. Since she felt the car payment in Example 2 was a little high each month, she shopped around and found a bank that would finance the car for 72 months at 2.9%. What would be the size of her monthly car payment?

Solution:
[■] [C ALL]
[1] [2] [■] [P/YR]
[7] [2] [N]
[2] [•] [9] [I/YR]
[2] [4] [9] [9] [5] [PV]
[PMT]

Answer: $-378.65 per month. That might fit more easily into Sarah's budget.

Example 4: Fred owes Tony $2,500. Fred agrees to pay Tony $400 now and to pay off the remainder of the debt with monthly payments over the next 12 months. If they agree that interest should be assessed at 9%, compounded monthly, what payment would Fred make each month?

Solution:
[■] [C ALL]
[1] [2] [■] [P/YR]
[1] [2] [N]
[9] [I/YR]
[2] [5] [0] [0] [−] [4] [0] [0] [=] [PV]
[PMT]

Answer: $-183.65 per month.

Example 5: Terry just bought his girlfriend an engagement ring that cost $4,000. If he pays 5% as a down payment and finances the remaining balance at 7.5%, compounded monthly over 24 months, what is the size of the monthly payment Terry will be making?

Solution:
[■] [C ALL]
[1] [2] [■] [P/YR]
[2] [4] [N]
[7] [•] [5] [I/YR]
[4] [0] [0] [0] [−] [5] [%] [=] [PV]
[PMT]

Answer: $171.

Example 6: Heather and Howard are buying a house that costs $250,000. They must pay 20% down and can finance the remaining amount over 15 years at 5.65%, compounded monthly. What is the size of their monthly payment?

Solution: [■] [C ALL]
[1] [2] [■] [P/YR]
[1] [8] [0] [N]
[5] [•] [6] [5] [I/YR]
[2] [5] [0] [0] [0] [0] [−] [2] [0] [%] [=] [PV]
[PMT]

Answer: $-1,650.13 per month.