



hp calculators

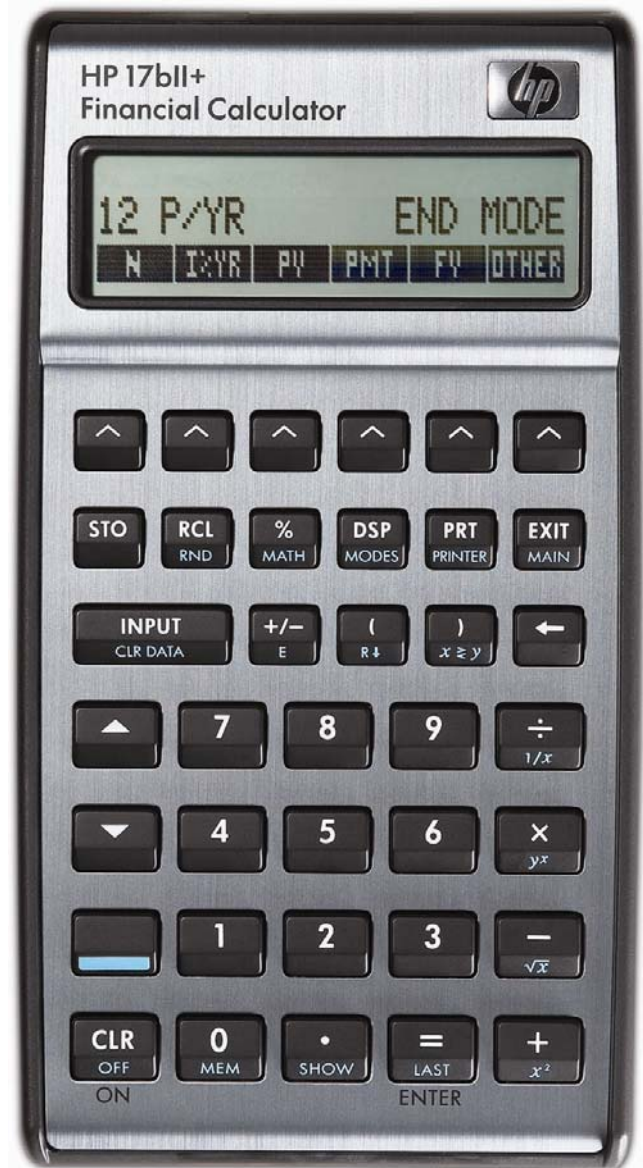
HP 17bII+ Solving for a required down payment

The time value of money application

Loan down payments

Cash flow diagrams and sign conventions

Practice solving loan down payment problems



The time value of money application

The time value of money application built into the HP 17bII+ is used to solve compound interest problems and annuities that involve regular, uniform payments. This application is accessed from the main menu level of the HP 17bII+ by pressing **2nd** then **FV**. Note that to access these menus, you must press the appropriate **⇧** key just below the symbols on the screen. If you do not see **2nd** displayed on the screen, you may be inside a different menu. You can return to the main menu and select the **2nd** menu by pressing **EXIT** **MAIN**.

When you enter the TVM environment for the first time, the screen will appear as shown in Figure 1 below.



Figure 1

Compound interest problems require the input of 3 of these 4 values: **N**, **I%YR**, **PV**, **FV**. 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.

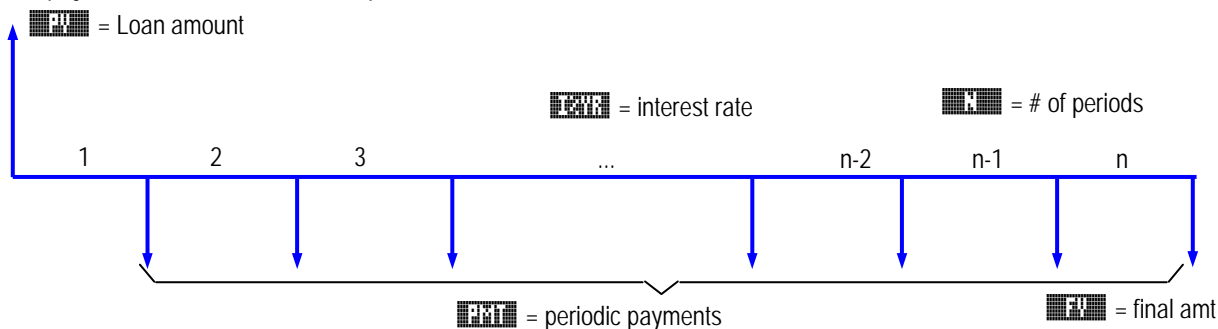
Interest rates are always entered as the number is written in front of the percent sign, i.e., 5% is entered as a 5 rather than as 0.05. Values for N are always the total number of periods – if a problem has an interest rate that is compounded monthly and the time frame is 5 years, the value entered for N would be 60 total periods. Additional information can be found in the learning module covering time value of money basics. Additional information can be found in the learning module covering time value of money basics.

Loan Down Payments



Down payments are often made on loans to lower the required periodic payment. Down payments are also required to ensure an investment in the property has been made by the loan applicant, thereby reducing the risk to the lender that the loan will be abandoned. The process to be used is to input the payment the applicant can afford and determine the equivalent Present Value (PV). The difference between this PV and the actual loan amount will indicate the down payment necessary to achieve the required payment.

Cash flow diagrams and sign conventions

The sign conventions for cash flows on the HP 17bII+ 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 down payments and their relationship with the TVM variables.



Practice solving loan down payment problems

NOTE: Once you begin working these problems, the keystrokes shown assume you do not leave the TVM menu environment. Should you leave that environment and then decide to work a problem below other than Example 1, you should press    to return to the TVM environment.

Example 1: Tommy wants to buy a car and can afford a payment of \$400 a month. If the car costs \$25,000 and Tommy can get a 72 month loan at 6.9%, compounded monthly, how much must Tommy give as a down payment to lower his payment to \$400 a month?

























Solution:    
    
  
   
      




Figure 2

At this point, the display shows 23,527.99. Now press:






















           (in algebraic mode)
          (in RPN mode)



Figure 3

Answer: To lower his monthly payment to \$400, Tommy needs to make a \$1,472.01 down payment.

Example 2: Jane is looking to buy a house and can afford a payment of \$1,400 a month. If the house costs \$270,000 and Jane can get a 30 year loan at 5.4%, compounded monthly, how much must Jane give as a down payment to lower her payment to \$1,400 a month?




























Solution:    
    
    
   
       




Figure 4

At this point, the display shows 249,318.47. Now press:






















           (in algebraic mode)
          (in RPN mode)



Figure 5

Answer: To lower her monthly payment to \$1,400, Jane needs to make a \$20,681.53 down payment.

Example 3: Kevin wants to buy a boat and can afford \$250 a month for this purchase. The boat costs \$15,600 and Kevin can get a 72-month loan at 8.9%, compounded monthly. How much must Kevin pay as a down payment to lower his monthly payment to \$250 a month?

Solution:



Figure 6

At this point, the display shows 13,907.47. Now press:

[+/-] [E] [÷] [x²] [1] [5] [6] [0] [MEM] [0] [MEM] [=] (in algebraic mode)

[+/-] [E] [1] [5] [6] [0] [MEM] [0] [MEM] [+/-] (in RPN mode)



Figure 7

Answer: To lower his monthly payment to \$250, Kevin needs to make a \$1,692.53 down payment.