



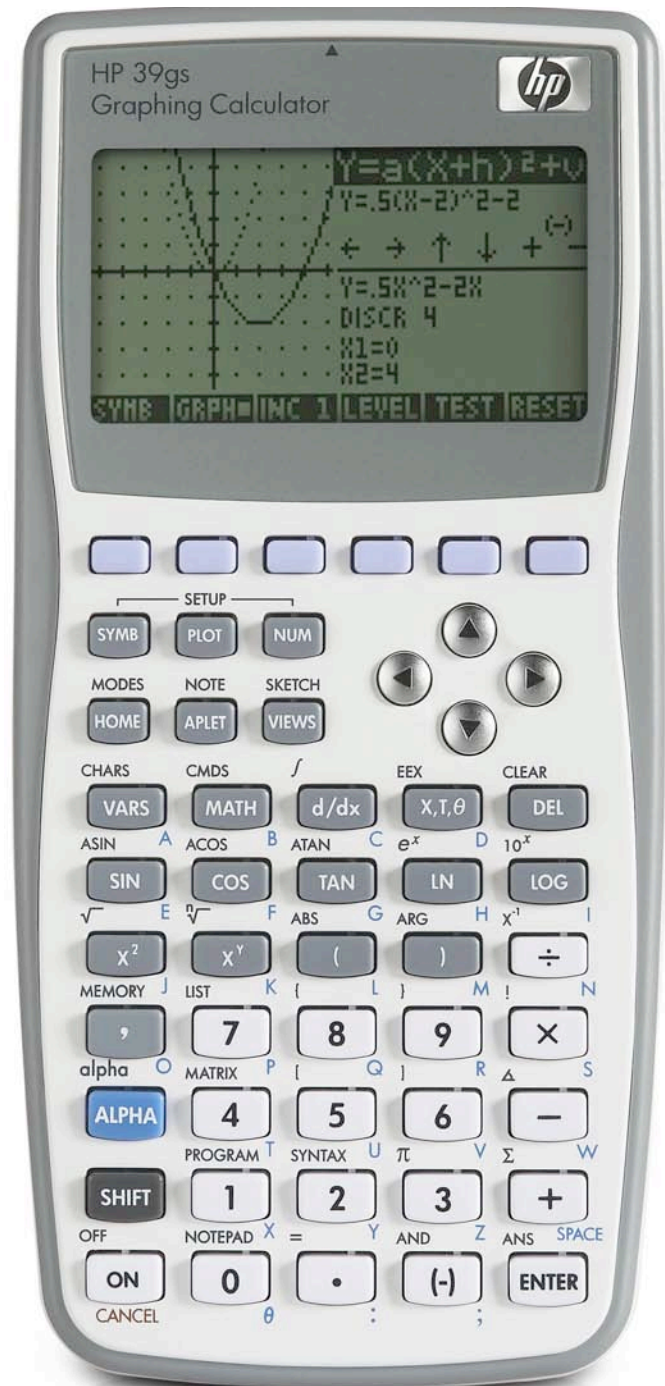
hp calculators

HP 39gs Amortization Schedules

The FINANCE menu

Loan Amortizations

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The FINANCE aplet

The HP 39gs has a financial solver aplet built into the calculator. To access this aplet, press $\boxed{\text{APLET}}$. Scroll down the list using the \downarrow key until "Finance" is highlighted in the display as shown below.



Figure 1

Press $\boxed{\text{START}}$ to begin the aplet. A data entry form is then displayed that is used to solve a number of financial math problems.

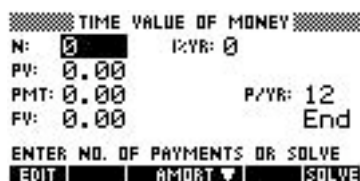


Figure 2

To solve problems using this display, move the cursor using the \leftarrow , \uparrow , \downarrow , \rightarrow keys to each field and input its value, if known. To solve for the unknown value, move the cursor to the field for which you wish to solve, and press menu key labeled $\boxed{\text{MENU}}$. The value of the unknown will be calculated and displayed in the field. Note: If you enter the aplet and values are already present in some of the fields, you can clear these values to their default state by pressing the $\boxed{\text{SHIFT}}$ key and then $\boxed{\text{DEL}}$, to access the CLEAR function written above it.

Several values are already present on this screen. The number of payments per year is set to 12 for monthly compounding, as shown to the right of the P/YR: in the screen above. If annual compounding is desired, this value should be changed to 1. If quarterly compounding is desired, this value should be changed to 4. Just below the P/YR: field, the calculator displays the word END, signifying that payments are assumed to occur at the end of each period, which would be the case for ordinary annuities. If payments are desired at the beginning of the period, as would be the case in an annuity due, this value can be changed by moving the cursor to this field. When the cursor is on this field, $\boxed{\text{CHOOSE}}$ is displayed above the second menu key, indicating the calculator will supply a list of choices (Begin or End) in a small CHOOSE box if this key is pressed. Note that Begin will be displayed as Beg if chosen. To exit from this data entry screen, press a key that starts another function.



Figure 3

The HP 39gs Financial solver follows the standard convention that money in is considered positive and money out is negative.

Loan amortizations

A loan amortization is a schedule of how payments made on a loan will pay off the loan. Each payment made on a loan has a portion to cover interest owed since the last payment with the remainder going to reduce the amount owed. Early in the life of a loan, almost all of the payment goes to cover interest. Over time, this proportion of the payment going to interest decreases and more of each payment reduces the amount owed. The amortization schedule indicates for each payment (or for a range of payments) how much of the payment(s) went to interest and how much went to principal.

On the HP 39gs, this is done through the $\boxed{\text{AMORT}}$ menu label (press the fourth menu key), as displayed below.

```

TIME VALUE OF MONEY
N: 0      I%YR: 0
PV: 0.00
PMT: 0.00  P/YR: 12
FV: 0.00      End
ENTER PAYMENT AMOUNT OR SOLVE
EDIT  AMORT  SOLVE

```

Figure 4

When this key is pressed, a new data entry form is displayed.

```

AMORTIZE
PAYMENTS: 12
PRINCIPAL:
INTEREST:
BALANCE:
ENTER NO. OF PAYMENTS TO AMORT
EDIT  TVM  B→PV AMOR

```

Figure 5

The first field displayed is for the number of payments the amortization is requested. Here it has defaulted to 12, or one year's worth for a loan being paid monthly. To compute the amount of principal reduced, interest paid, and remaining balance after a specific number of payments, key in the number of payments for which an amortization schedule is wanted and press the **AMOR** menu label. The values will be computed and displayed on this screen. The **AMOR** menu label will copy the remaining balance value from this amortization screen and store it into the PV field on the previous data entry form. It will then be available for further computations, if desired. To return to the previous data entry form, press the **TVM** key.

Practice solving loan amortization problems

Example 1: Jack bought a car for \$25,195. He will pay for the car with a 3.9%, compounded monthly loan that will have 60 payments. How much of Jack's first payment will go for interest and principal reduction? How much will his entire first year of payments reduce the outstanding loan balance?

Solution: **APLET** (press **↓** until the "Finance" aplet is highlighted) **TIME**
6 **0** **ENTER** **3** **.** **9** **ENTER** **2** **5** **1** **9** **5** **ENTER** **↓** **1** **2** **ENTER** **0** **ENTER** **↑** **AMOR**
 (Jack's payment of \$462.87 is displayed)

```

TIME VALUE OF MONEY
N: 60      I%YR: 3.9
PV: 25,195.00
PMT: -462.87  P/YR: 12
FV: 0.00      End
ENTER PAYMENT AMOUNT OR SOLVE
EDIT  AMORT  SOLVE

```

Figure 6

Then press **AMORT** **↓** **1** **ENTER** **AMOR**

```

AMORTIZE
PAYMENTS: 1
PRINCIPAL: -380.98
INTEREST: -81.88
BALANCE: 24,814.02
EDIT  TVM  B→PV AMOR

```

Figure 7

Then press **↑** **1** **2** **ENTER** **AMOR**

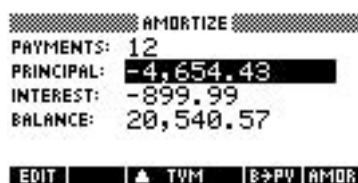


Figure 8

Answer: First payment amount to interest: \$81.88. First payment amount to principal reduction: \$380.98. Outstanding loan balance after one year: \$20,540.57

Example 2: Jill bought a house for \$210,000. Her 30-year loan will have an interest rate of 6%, compounded monthly. How much of Jill's first payment will go for interest and principal reduction? How much will her entire first year of payments reduce the outstanding loan balance?

Solution: **APLET** (press \downarrow until the "Finance" aplet is highlighted) **QUIT**
 $\boxed{3}\boxed{6}\boxed{0}\boxed{\text{ENTER}}\boxed{6}\boxed{\text{ENTER}}\boxed{2}\boxed{1}\boxed{0}\boxed{0}\boxed{0}\boxed{0}\boxed{\text{ENTER}}\boxed{1}\boxed{2}\boxed{\text{ENTER}}\boxed{0}\boxed{\text{ENTER}}\boxed{\leftarrow}\boxed{\rightarrow}\boxed{\text{QUIT}}$
 (Jill's house payment of \$1,259.06 is displayed)



Figure 9

Then press **AMORT** \downarrow $\boxed{1}\boxed{\text{ENTER}}$ **QUIT**



Figure 10

Then press $\boxed{\uparrow}\boxed{1}\boxed{2}\boxed{\text{ENTER}}$ **QUIT**

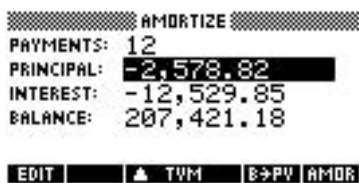


Figure 11

Answer: First payment amount to interest: \$1,050.00. First payment amount to principal reduction: \$209.06. Outstanding loan balance after one year: \$207,421.18

Example 3: Bill bought a house 25 years ago for \$30,000. His 30-year loan had an interest rate of 7%, compounded monthly. How much interest has Bill paid on his loan these past 25 years? How much does Bill still owe on the house loan?

Solution: **APLET** (press \downarrow until the "Finance" aplet is highlighted) **QUIT**
 $\boxed{3}\boxed{6}\boxed{0}\boxed{\text{ENTER}}\boxed{7}\boxed{\text{ENTER}}\boxed{3}\boxed{0}\boxed{0}\boxed{0}\boxed{0}\boxed{\text{ENTER}}\boxed{1}\boxed{2}\boxed{\text{ENTER}}\boxed{0}\boxed{\text{ENTER}}\boxed{\leftarrow}\boxed{\rightarrow}\boxed{\text{QUIT}}$
 Bill's monthly house payment of \$199.59 is displayed).

```

TIME VALUE OF MONEY
N: 360    I/YR: 7
PV: 30,000.00
PMT: -199.59    P/YR: 12
FV: 0.00        End
ENTER PAYMENT AMOUNT OR SOLVE
EDIT    AMORT    SOLVE

```

Figure 12

Then press **AMORT** **3** **0** **0** **ENTER**

```

AMORTIZE
PAYMENTS: 300
PRINCIPAL: -19,920.27
INTEREST: -39,956.96
BALANCE: 10,079.73
EDIT    TVM    <-PV    AMOR

```

Figure 13

Answer: After making payments for 25 years (300 months), Bill has paid \$39,956.96 in interest. With 5 years remaining on the house loan, Bill still owes \$10,079.73.