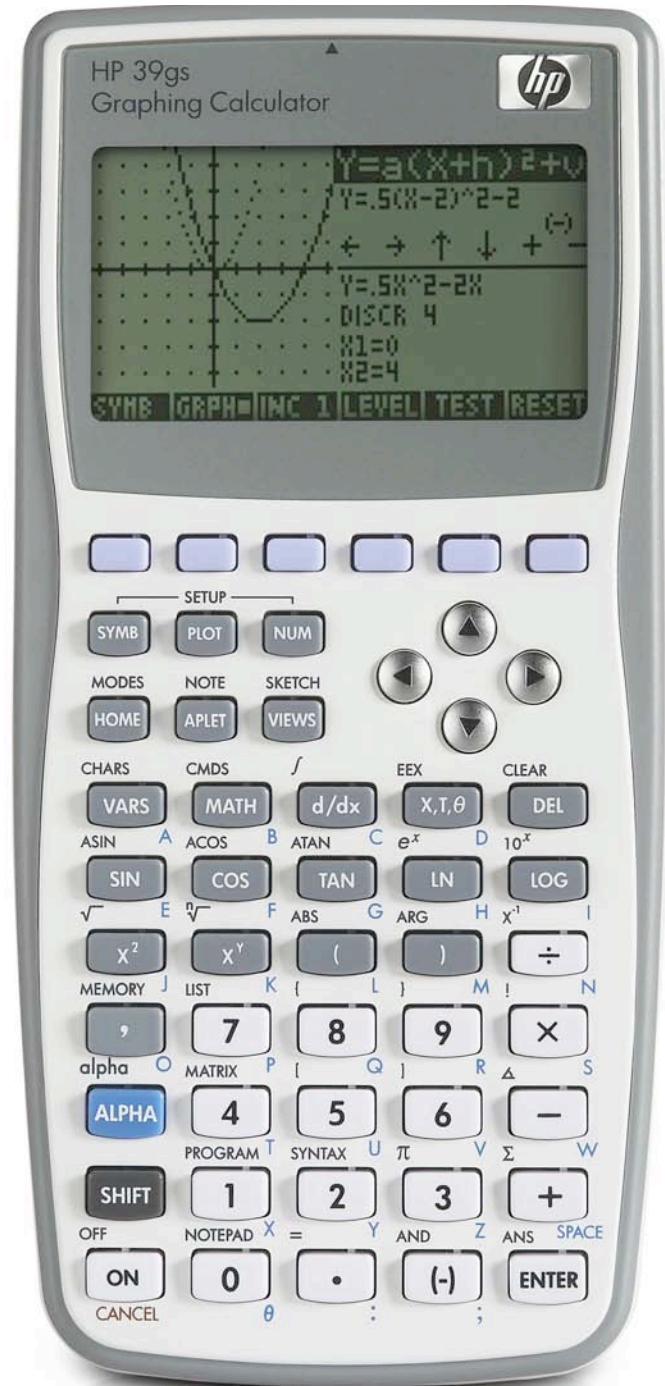# hp calculators

HP 39gs House Loan Amortization Schedules

The FINANCE menu

House loan amortizations

Practice solving house loan amortization problems

The FINANCE aplet

The HP 39gs has a financial solver aplet built into the calculator. To access this aplet, press ⒜ᴾᴸᴱᵀ. Scroll down the list using the ⊙ key until "Finance" is highlighted in the display as shown below.

```
▓▓▓▓▓▓▓APLET LIBRARY▓▓▓▓▓20.1K▓
Parametric        0KB ▲
Polar             0KB
Sequence          0KB
Solve             0KB
Finance           0KB ▼
SAVE RESET SORT SEND RECV START
```
Figure 1

Press ▓START▓ to begin the aplet. A data entry form is then displayed that is used to solve a number of financial math problems.

```
▓▓▓▓▓▓TIME VALUE OF MONEY▓▓▓▓▓▓
N:  0          I%YR: 0
PV: 0.00
PMT: 0.00           P/YR: 12
FV: 0.00            End

ENTER NO. OF PAYMENTS OR SOLVE
EDIT       AMORT ▼       SOLVE
```
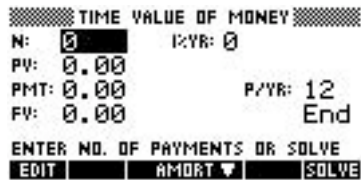Figure 2

To solve problems using this display, move the cursor using the ⊙⊙⊙⊙ 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 ▓SOLVE▓. 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 ⒮ᴴᴵᶠᵀ key and then ⒟ᴱᴸ, 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, ▓CHOOS▓ 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.

```
▓▓▓▓▓▓TIME VALUE OF MONEY▓▓▓▓▓▓
N:  0          I%YR: 0
PV: 0.00
PMT: 0.00           P/YR: 12
FV: 0.00            End

CHOOSE WHEN PAYMENTS ARE MADE
     CHOOS AMORT ▼
```
Figure 3

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

House 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.

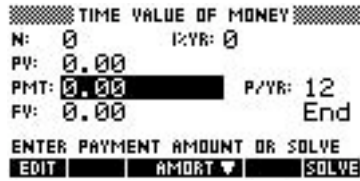On the HP 39gs, this is done through the ▓AMORT ▼ menu label (press the fourth menu key), as displayed below.

```
░░░░░░░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 ▒▒▒▒ menu label. The values will be computed and displayed on this screen. The ▒▒▒▒ 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 house loan amortization problems

Example 1:   George bought a house for $310,000. His 25-year loan will have an interest rate of 7%, compounded monthly. How much of his first payment will go for interest and principal reduction? How much will his entire two years of payments reduce the outstanding loan balance?

Solution: [APLET] (press ⊙ until the "Finance" aplet is highlighted) ▒▒▒▒
[3][0][0] [ENTER] [7] [ENTER] [3][1][0][0][0][0] [ENTER] [▶][1][2] [ENTER] [0] [ENTER] [◀][▲]▒▒▒▒
(George's monthly house payment of $2,191.02 is displayed)

```
░░░░░░░TIME VALUE OF MONEY░░░░░░░
N:   300        I%YR: 7
PV:  310,000.00
PMT: [-2,191.02 ]  P/YR: 12
FV:  0.00              End

ENTER PAYMENT AMOUNT OR SOLVE
[EDIT |    | AMORT ▼ |    |SOLVE]
```
Figure 6

Then press ▒ AMORT ▼ [1] [ENTER]▒▒▒▒
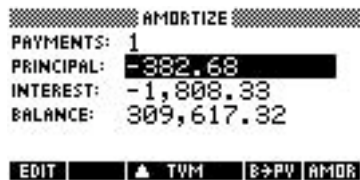
```
░░░░░░░░░░░AMORTIZE░░░░░░░░░░░
PAYMENTS: 1
PRINCIPAL: [-382.68     ]
INTEREST:  -1,808.33
BALANCE:   309,617.32

[EDIT |    | ▲ TVM |B→PV|AMOR]
```
Figure 7

Then press [▲][2][4] [ENTER]▒▒▒▒

```
▓▓▓▓▓▓▓▓▓▓▓ AMORTIZE ▓▓▓▓▓▓▓▓▓▓▓
PAYMENTS: 24
PRINCIPAL: -9,827.67
INTEREST: -42,756.70
BALANCE:   300,172.33
```
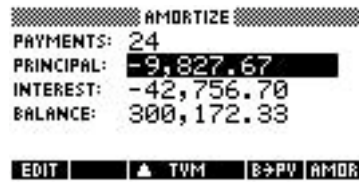`EDIT |      | ▲ TVM |B→PV|AMOR`   Figure 8

Answer: First payment amount to interest: $1,808.33. First payment amount to principal reduction: $382.68. Outstanding loan balance after two years: $300,172.33

Example 2:   Jimmy bought a house for $225,000 and will pay for it over 30 years at 6%, compounded monthly. How much interest will Jimmy pay over the first 6 months? How much will Jimmy still owe after making payments for 20 years?

Solution: `APLET` (press ⊙ until the "Finance" aplet is highlighted) ▓▓▓▓
        `3` `6` `0` `ENTER` `6` `ENTER` `2` `2` `5` `0` `0` `0` `ENTER` ⊙ `1` `2` `ENTER` `0` `ENTER` ◄ ▲ ▓▓▓▓
        (Jimmy's monthly house payment of $1,348.99 is displayed).

```
▓▓▓▓▓▓▓ TIME VALUE OF MONEY ▓▓▓▓▓▓▓
N:   360      I%YR: 6
PV:  225,000.00
PMT: -1,348.99   P/YR: 12
FV:  0.00              End

ENTER PAYMENT AMOUNT OR SOLVE
```
`EDIT |      | AMORT ▼ |   |SOLVE`   Figure 9

Then press ▓▓▓▓ AMORT ▼ ▓ `6` `ENTER` ▓▓▓▓

```
▓▓▓▓▓▓▓▓▓▓▓ AMORTIZE ▓▓▓▓▓▓▓▓▓▓▓
PAYMENTS: 6
PRINCIPAL: -1,360.84
INTEREST: -6,733.09
BALANCE:   223,639.16
```
`EDIT |      | ▲ TVM |B→PV|AMOR`   Figure 10

Then press ▲ `2` `4` `0` `ENTER` ▓▓▓▓

```
▓▓▓▓▓▓▓▓▓▓▓ AMORTIZE ▓▓▓▓▓▓▓▓▓▓▓
PAYMENTS: 240
PRINCIPAL: -103,491.93
INTEREST: -220,265.35
BALANCE:   121,508.07
```
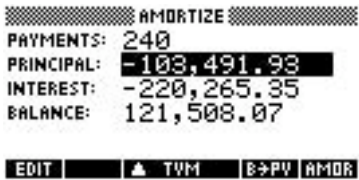`EDIT |      | ▲ TVM |B→PV|AMOR`   Figure 11

Answer: After making payments for 6 months, Jimmy has paid $6,733.09 in interest. After making payments for 20 years, Jimmy will still owe a depressing $121,508.07.