



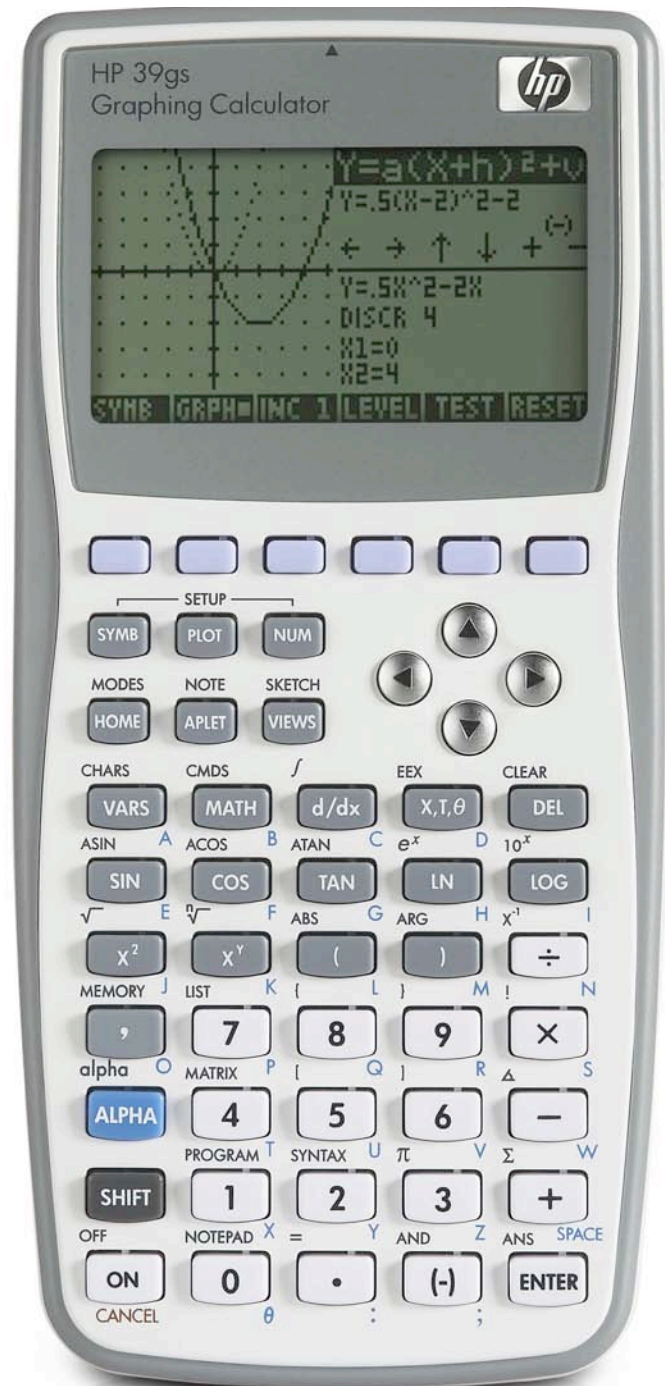
## hp calculators

HP 39gs House Payment Qualification

The FINANCE aplet

House payment qualification

Practice solving house payment qualification problems



### The FINANCE aplet

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



Figure 1

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

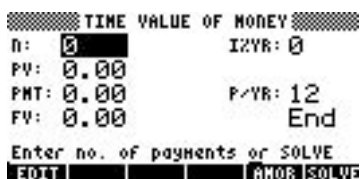


Figure 2

To solve problems using this display, move the cursor using the **◀** **▶** **▲** **▼** 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 **□□□□**. 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 **SHIFT** key and then **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, **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.

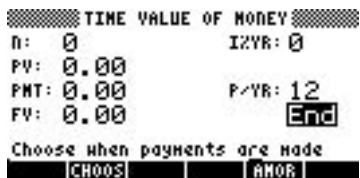


Figure 3

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

### House payment qualification

The payment required to pay off a house over time involves the solution of an ordinary annuity with the value of the payment as the unknown variable. When applying for a house loan or mortgage, the lender takes the applicant's debt burden into account. A general guideline applied is that the total debt to income should be below 34% and that the house payment plus taxes and insurance should be below 27% of total income. If a house payment composed of principal and interest were \$900, monthly taxes and insurance might add an additional \$100 a month or more to this payment. This will determine the maximum house payment for which an applicant may qualify as well as the corresponding maximum loan amount.

## Practice solving for house payment qualification problems

**Example 1:** Richard wants to buy a house that costs \$170,000 using a 30 year loan at 6% compounded monthly. His annual income is \$55,000. His existing monthly debt includes a car payment of \$295 per month and a minimum payment on his credit card of \$25 per month. Property taxes are estimated at \$1,300 per year and the annual insurance premium is estimated at \$450 per year. Can Richard qualify for this house loan if the lender applies the 27%/34% guidelines?

**Solution:** Richard's monthly income is \$55,000 divided by 12, or \$4,583.33

5 5 0 0 0 ÷ 1 2 ENTER

The maximum house payment (including taxes and insurance) Richard can qualify for is 27% of his monthly income, or \$1,237.50

× 0 . 2 7 ENTER

The maximum monthly debt Richard can have is 34% of his monthly income, or \$1,558.33

↑ ↑ ↑ [MODE] × 0 . 3 4 ENTER

The required payment on the house is found by the following:

[APLT] (press [↓] until the "Finance" aplet is highlighted) [MODE] 3 6 0 ENTER 6 ENTER 1 7 0 0 0 0 ENTER [→] 1 2 ENTER 0 ENTER [←] [MODE]

```

TIME VALUE OF MONEY
N: 360      I/YR: 6
PV: 170,000.00
PMT: -1,019.24  P/YR: 12
FV: 0.00      End
Enter payment amount or SOLVE
EDIT      AMOR SOLVE

```

Figure 4

The house payment is \$1,019.24 a month. With taxes and insurance, this increases to \$1,165.07

[MODE] - ( 1 3 0 0 + 4 5 0 ) ÷ 1 2 ENTER

```

TIME VALUE OF MONEY
N: 360      I/YR: 6
PV: 170,000.00
PMT: -1,165.07  P/YR: 12
FV: 0.00      End
ENTER NO. OF PAYMENTS PER YEAR
EDIT      AMORT

```

Figure 5

The \$1,165.07 is the total monthly house payment plus taxes and insurance. Richard's total monthly debt is to be less than 34% of his monthly income.

Richard's total debt would be the \$1,165.07 house payment, the \$295 car payment and the \$25 per month credit card payment. This is a total of \$1,485.07, which is less than the maximum monthly debt limit set by the 34% guideline.

[MODE] 1 1 6 5 . 0 7 + 2 9 5 + 2 5 ENTER

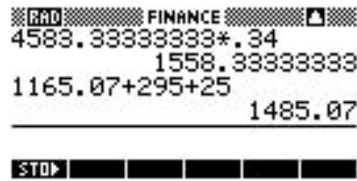


Figure 6

**Answer:** Richard can qualify for this house loan because he meets the 27%/34% guidelines.

**Example 2:** Caroline wants to buy a house that costs \$208,000 using a 15 year loan at 5% compounded monthly. Her annual income is \$75,000. Her existing monthly debt includes a car payment of \$365 per month and minimum payments on her credit card of \$96.50 per month. Property taxes are estimated at \$1,900 per year and the annual insurance premium is estimated at \$1,150 per year. Can Caroline qualify for this house loan if the lender applies the 27%/34% guidelines?

**Solution:** Assumes Algebraic mode. Caroline's monthly income is \$75,000 divided by 12, or \$6,250.

7 5 0 0 0 ÷ 1 2 ENTER

The maximum house payment (including taxes and insurance) Caroline can qualify for is 27% of her monthly income, or \$1,687.50

× 0 . 2 7 ENTER

The required payment on the house is found by the following:

APLET (press ▼ until the "Finance" aplet is highlighted) F1  
1 8 0 ENTER 5 ENTER 2 0 8 0 0 0 0 ENTER ► 1 2 ENTER 0 ENTER ◀ ▲ F2



Figure 7

The house payment is \$1,644.85 a month. With taxes and insurance, this increases to \$1,899.02

F1 - ( 1 9 0 0 + 1 1 5 0 ) ÷ 1 2 ENTER



Figure 8

The \$1,899.02 is the total monthly house payment plus taxes and insurance. This is larger than the 27% guideline previously computed.

**Answer:** Caroline cannot qualify for this house loan because she does not meet the 27% guideline. Perhaps she should consider a 30 year loan.