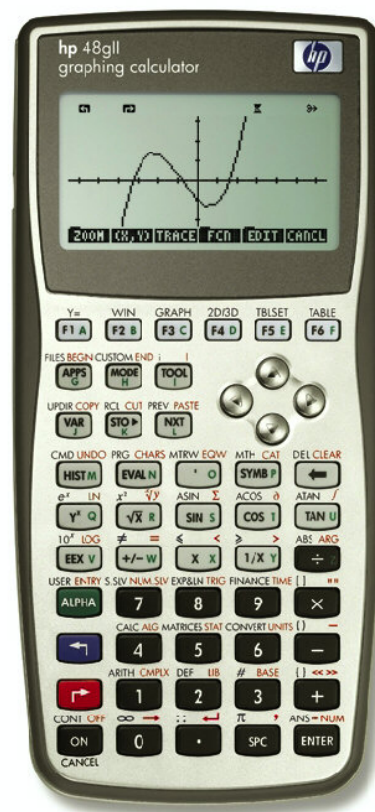# hp calculators

HP 48GII Bond Price

The FINANCE menu

Bond Price

Practice solving for the price of a bond

The FINANCE menu

The Finance solver is accessed from the BLUE shifted function of the $\boxed{9}$ key by pressing $\boxed{\leftarrow}$ *FINANCE* . When pressed, a data entry form is displayed that is used to solve a number of financial math problems.

```
░░░░░TIME VALUE OF MONEY░░░░░
n:  █           I%YR: 0
PV:  0.00
PMT: 0.00       P/YR: 12
FV:  0.00             End

Enter no. of payments or SOLVE
EDIT           AMOR SOLVE
```
Figure 1

To solve problems using this display, move the cursor using the $\boxed{\triangleleft}\boxed{\triangledown}\boxed{\triangle}\boxed{\triangleright}$ 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 the $\boxed{F6}$ key to register the choice of ▓▓▓▓▓, which is displayed above it. The value of the unknown will be calculated and displayed in the field. The solved value of the variable will be copied to the first level of the command stack in case further calculations with it are desired.

Variables are created whenever a value is stored in one of the financial fields or when it has been solved. These variables (N for example holds the value for n) can be seen in the $\boxed{VAR}$ menu. When they are no longer needed, they can be deleted just like any other user-created variables. Values from a previous use of the financial solver remain until the variables holding them are deleted.

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, ▓▓▓▓▓ is displayed above the $\boxed{F2}$ 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 the $\boxed{ON}$ key.

```
░░░░░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        AMOR
```
Figure 2

The HP 48GII Financial solver follows the standard convention that money in is considered positive and money out is negative.

Bond Prices

A bond is a financial instrument where a company, government entity, or individual borrow money with the promise to pay interest periodically and to repay the initial amount borrowed at a specified future date. Bonds will usually have a specified interest rate (called the coupon rate) and are most often in denominations of $1,000. Bonds also usually pay interest every six months. The interest rate the bond pays is fixed when the bond is first sold or issued, but changes in the market interest rate will change the price of the bond over its life. If market interest rates have gone up since the bond was purchased, the price of the bond will have gone down. If, however, market interest rates have gone down since the bond was purchased, the price of the bond will have gone up. The HP 48GII can directly solve for bond prices using the FINANCE data entry form in simple situations where a bond interest payment is exactly one period away. For other situations, the answers will be approximations. To solve these other bond price problems, the built-in solver of the HP 48GII can be used to enter the bond price formulas.

Practice solving for the price on a bond

Example 1:   A bond with 20 years left has a 5% coupon rate and pays interest semiannually. If the market interest rate is now 6%, compounded semiannually, for what price should this bond be selling?

Solution: Since the bond is paying interest semiannually, the 5% interest paid of $50 will be paid as $25 every six months. If the bond has 20 years left, the value for N will be 40 periods.

← FINANCE 4 0 ENTER 6 ENTER ▼ 2 5 +/- ENTER 2 ENTER / 0 0 0 +/- ENTER
◄ ▲ ▲ SOLVE

```
░░░░░░░TIME VALUE OF MONEY░░░░░░░
n:   40          I%YR: 6
PV: 884.43
PMT: -25.00      P/YR: 2
FV: -1000.00          End
Enter present value or SOLVE
EDIT          AMOR SOLVE
```
Figure 3

Answer: $884.43

Example 2:   A bond with 10 years left until it matures has a 6% coupon rate and pays interest semiannually. What is the price of this bond, if the market interest rate is 5%, compounded semiannually?

Solution: Since the bond is paying interest semiannually, the 6% interest paid of $60 will be paid as $30 every six months. If the bond has 10 years left, the value for N will be 20 periods.

← FINANCE 2 0 ENTER 5 ENTER ▼ 3 0 +/- ENTER 2 ENTER / 0 0 0 +/- ENTER
◄ ▲ ▲ SOLVE

```
░░░░░░░TIME VALUE OF MONEY░░░░░░░
n:   20          I%YR: 5
PV: 1077.95
PMT: -30.00      P/YR: 2
FV: -1000.00          End
Enter present value or SOLVE
EDIT          AMOR SOLVE
```
Figure 4

Answer: $1,077.95

Example 3:   A bond with 13 years left until it matures has a 5.5% coupon rate and pays interest semiannually. What is the price of this bond, if the market interest rate is 6.15%?

Solution: Since the bond is paying interest semiannually, the 5.5% interest paid of $55 will be paid as $27.50 every six months. If the bond has 13 years left, the value for N will be 26 periods.

← FINANCE 2 6 ENTER 6 · / 5 ENTER ▼ 2 7 · 5 0 +/- ENTER 2 ENTER
/ 0 0 0 +/- ENTER ◄ ▲ ▲ SOLVE

```
░░░░░░░TIME VALUE OF MONEY░░░░░░░
n:   26          I%YR: 6.15
PV: 942.40
PMT: -27.50      P/YR: 2
FV: -1000.00          End
Enter present value or SOLVE
EDIT          AMOR SOLVE
```
Figure 5

Answer: $942.40