



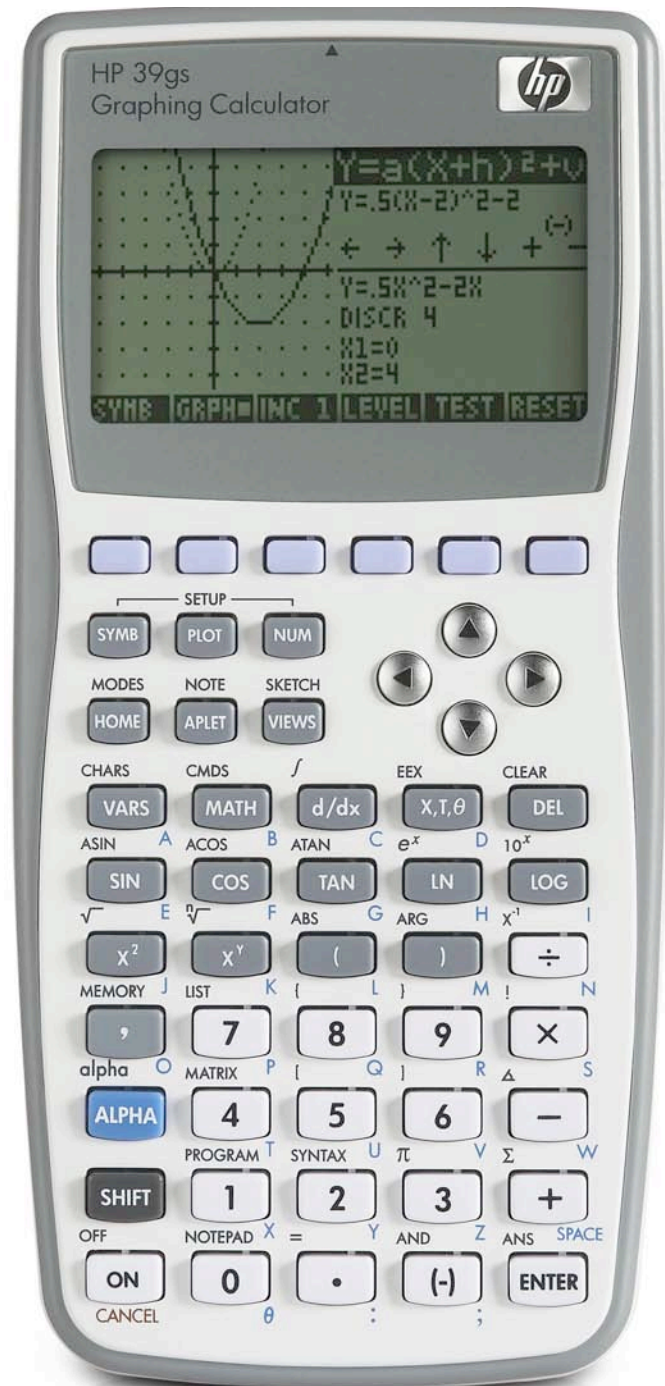
## hp calculators

HP 39gs Bond Yields

The FINANCE aplet

Bond Yields

Practice solving for the yield of a bond



## 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.

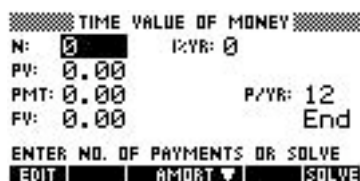


Figure 2

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 **ENTER**. 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.

## Bond Yields

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 a bond is purchased for exactly \$1,000, the bond's yield (total return to the purchaser) will be equal to the bond's coupon rate. If, however, a bond is purchased for more or less than the original \$1,000 amount, the total return or yield will be different from the coupon rate. The HP 39gs 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 39gs can be used to enter the bond price formulas.

### Practice solving for the yield on a bond

**Example 1:** A bond with 20 years left until it matures is selling for \$900. It has a 5% coupon rate and pays interest semiannually. What is the yield if this bond is purchased?

**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.

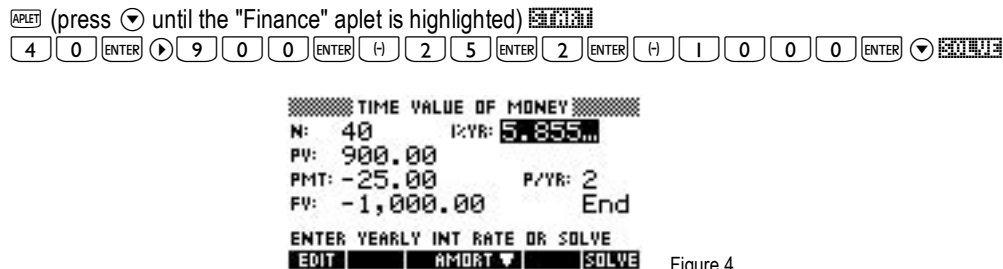


Figure 4

**Answer:** 5.855%

**Example 2:** A bond with 10 years left until it matures is selling for \$1,145. It has a 6% coupon rate and pays interest semiannually. What is the yield if this bond is purchased?

**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.

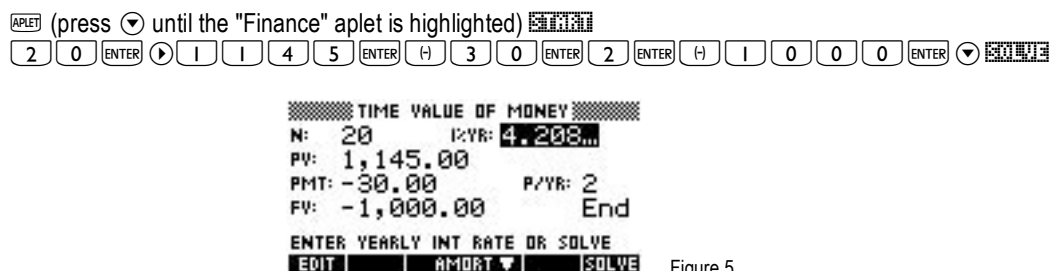
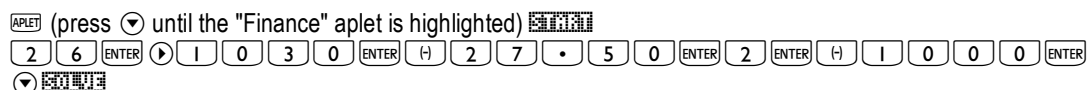


Figure 5

**Answer:** 4.208%

**Example 3:** A bond with 13 years left until it matures is selling for \$1,030. It has a 5.5% coupon rate and pays interest semiannually. What is the yield if this bond is purchased?

**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.



## hp calculators

### HP 39gs Bond Yields

---

```
TIME VALUE OF MONEY
N: 26      I/YR: 5.180...
PV: 1,030.00
PMT: -27.50      P/YR: 2
FV: -1,000.00      End
ENTER YEARLY INT RATE OR SOLVE
[EDIT] [AMORT] [SOLVE]
```

Figure 6

Answer:      5.18%