

Compound Interest


Simple interest computations always use the starting principal as the basis for calculating the periodic interest. In compound interest computations, the interest from the previous period is added to the current principal and the new total is used as the basis for calculating the interest.

Objectives:

- Determine the future value of an investment.
- Determine the amount of money to be invested in order to reach a savings goal in the future.

Example 1:

What is the future value of a \$20,000 Certificate of Deposit invested for 5 years at 6% compounded annually?

1. Press , and select **New** to start a new document. Select **Add Calculator**.

Note: To round computations to two decimal places, change the Display Digits setting in the Documents Settings to **Fix 2**.


2. Press **Menu > Finance**. Select **Finance Solver**.

N is the number of payment periods, **I(%)** is the annual interest rate, **PV** is the Present Value, **Pmt** is the Payment Amount, **FV** is the Future Value, **PpY** is the number of payment periods per year, and **CpY** is the number of compounding periods per year. The last row, **PmtAt**, indicates whether payments are made at the end or beginning of each payment period.

To move from row to row in the Finance Solver, press .

3. For this example, enter $N = 5$, $I(\%) = 6$, $PV = -20000$, $Pmt = 0$, $PpY = 1$, and $CpY = 1$.

Notice that the money invested, PV , is entered as a negative number because cash outflows are considered negative, while inflows are positive.

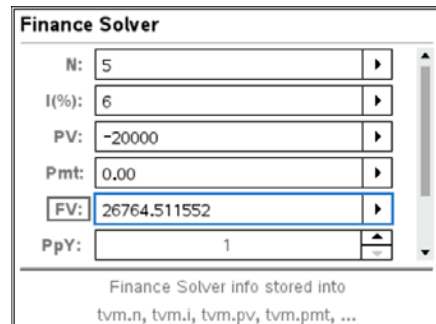
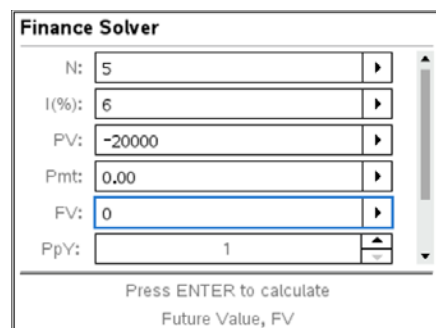
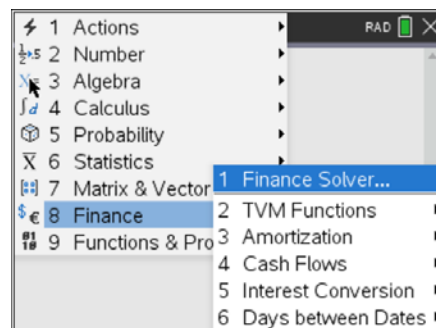
4. Place the cursor in the Future Value (FV) row. Press  to calculate the Future Value.

Note the presence of the rectangle around FV, which indicates that FV has been calculated for the given input values.

The future value of the certificate of deposit is \$26,764.51.


Tab to another row to display the Future Value rounded to two decimal places.


Press  to exit the Finance Solver.




Example 2:

Tracy invested \$2,000 at 6% compounded quarterly for 5 years. What will his investment be worth in 5 years?


1. Press , and select **New** to start a new document. Select **Add Calculator**. Press **Menu > Finance**. Select **Finance Solver**.

To move from row to row in the Finance Solver, press .

N is the number of payments. N equals 5 years multiplied by 4 payments per year or 20 payments. $I(\%) = 6$ and $PV = -2000$. Notice that PV is entered as a negative number because, from Tracy's perspective, the \$2,000 is cash output; it is money leaving his hand. Pmt is 0. Payments per year, PpY, and compounding periods, CpY, are each 4.

2. Place the cursor in the Future Value (FV) row. Press  to calculate the Future Value \$2,693.71. Note the presence of the rectangle around FV, which indicates that FV has been calculated for the given input values. Tab to another row to display the Future Value rounded to two decimal places.

If N is entered in years (5) rather than payment periods (20), then PpY should be changed to 1. Ensure that CpY is 4. This gives the same result for FV, \$2,693.71.

Press  to exit the Finance Solver.

Finance Solver	
N:	20
I(%):	6
PV:	-2000
Pmt:	0.00
FV:	0.
PpY:	4
Press ENTER to calculate Future Value, FV	
PpY:	4
CpY:	4
PmtAt:	END

Finance Solver	
N:	20
I(%):	6
PV:	-2000
Pmt:	0.00
FV:	2693.7100131001
PpY:	4
Finance Solver info stored into tvm.n, tvm.i, tvm.pv, tvm.pmt, ...	

Finance Solver	
N:	5
I(%):	6
PV:	-2000
Pmt:	0.00
FV:	2693.7100131001
PpY:	1
Finance Solver info stored into tvm.n, tvm.i, tvm.pv, tvm.pmt, ...	
PpY:	1
CpY:	4
PmtAt:	END

Example 3:

Find the future value of \$8,000 invested for 6 years at 8% compounded monthly.

Use the **Finance Solver** and enter all of the values except FV. Move the cursor to FV and press **enter** to get \$12,908.02.

Finance Solver	
N:	6
I(%):	8
PV:	-8000
Pmt:	0.00
FV:	0
PpY:	1
Edit Compound Periods / Yr, CpY	
FV:	12908.017338479
PpY:	1
CpY:	12
PmtAt:	END

Example 4:

How much money should you deposit in a savings and loan association paying 6% compounded quarterly in order to have \$3,000 in 5 years?

Use the **Finance Solver** and enter all of the values except PV. Move the cursor to PV and press **enter** to get -\$2,227.41.

Notice PV is negative because it is cash paid out by the investor.

Finance Solver	
N:	5
I(%):	6
PV:	-2227.4112546713
Pmt:	0.00
FV:	3000
PpY:	1
Edit Present Value, PV	
PpY:	1
CpY:	4
PmtAt:	END

If N is changed from 5 years to 20 payment periods, change the number of payment periods per year, PpY, to 4 to get the same result. The number of compounding periods per year, CpY, remains 4.

Finance Solver	
N:	20
I(%):	6
PV:	-2227.4112546713
Pmt:	0.00
FV:	3000
PpY:	4
Finance Solver info stored into tvm.n, tvm.i, tvm.pv, tvm.pmt, ...	