Using the Texas Instrument BA II Plus

Settings

Before using your calculator, you need to change two settings.

First enter <2nd> <FORMAT>. This will bring up DEC=2. This area allows you to change the number of decimals displayed by the calculator. Type in <9> <ENTER>. This changes the decimal format to floating and will show up to 9 decimal places if applicable.

Next, enter <2nd> <P/Y>. This area allows you to change the number of payments per year. The default setting is 12. To change this type <1> <ENTER>. Changing this to one payment per period allows you to work with a different number of compounding periods per year without changing the setting. Any entries in the calculator are now based on the interest rate per period and the number of periods.

Important: If your calculator ever shows two digits again, you will also need to change the compounding periods back to 1 since you have reset the settings.

Basic Time Value of Money Keys

The basic time value of money keys are:
<N>   : The number of periods.
<I/Y> : Interest per year. With the earlier change in settings, we are using this key as
           the interest rate per period.
<PV>   : Present value at time 0.
<PMT> : Payment amount. This key is the amount of an annuity payment.
<FV>   : Future value.
<CPT> : With another key computes an unknown value.

To clear all previous values entered in the time value keys, enter <2nd> <CLR TVM>. This will clear all values entered into these keys previously. Get in the habit of hitting <2nd> <CLR TVM> before you start any problem. The most common mistake made is not clearing previous values before starting a new problem. If you do not clear values prior to starting a problem, the calculator will keep and use any values entered previously.

Calculations with Lump Sums

Future Value of a Lump Sum:
You have $10,000 that you will invest at 7.75%. How much will you have at the end of 8 years?

To solve, enter 10,000 <PV>, 7.75 <I/Y>, 8 <N> and then <CPT> <FV>

Answer: $18,169.30. You will notice that the calculator displays the answer as a negative number. The calculator solves problems by making the entered values equal zero. If you think of the time line, one of the cash flows has to be negative. No one will give you $10,000 today and $18,169.30 in 8 years. One of the cash flows must be negative. If you think of this problem as a bank deposit then the initial cash flow is negative. Therefore, type in: 10,000 +/- <PV> {this makes the initial cash flow negative}, 7.75 <I/Y>, 8 <N>, <CPT> <FV>. You will notice that the answer is now a positive $18,169.30. This makes sense since your cash flows are -$10,000 at time 0 and a +$18,169.30 at time 8. If you analyze the problem from the bank's point of view, the cash flows are +$10,000 at time 0 and -$18,169.30 at time 8.

A second question often asked here is the order of entering the values from the problem. The BA II Plus does not require the values be entered in any particular order. For instance, you could enter 7.75 <I/Y>, 8 <N>, 10,000 <PV> and then <CPT> <FV> and you will still get the correct answer.

Present Value of a Lump Sum

You need to have $50,000 in ten years to go on an around the world cruise. How much do you need to deposit today if you can earn 9.75%?

To solve, enter 50,000 <FV>, 9.75 <I/Y>, 10 <N> and then <CPT> <PV>

Answer: $19,720.81 {Did you remember to hit <2nd> <CLR TVM> first?}

Finding the Interest Rate

You invested $10,000 five years ago. You currently have $18,810 in you account. What was your rate of return?

To solve, enter 10,000 +/- <PV>, 5 <N> and 18,810 <FV>, then <CPT> <I/Y>

Answer: 13.47%. Remember that one of the values must be negative. The answer will be the same regardless of which one you enter as a negative.

Finding the Number of Periods

You earn 6.6% APR compounded monthly on your savings account. If you deposit $3,000 today, how long will it take until you have $7,000 in your account?

To solve, enter 3,000 <PV>, 7,000 +/- <FV> and 6.6 ÷ 12 = <I/Y>, then <CPT> <N>.

Answer: 154.5 months, or 12.9 years. Note that you do not have to solve for the monthly interest rate, clear it out of the calculator and then re-enter it.

Working with Annuities

Calculating the Future Value of an Annuity

You plan to deposit $2,000 a year for retirement. You have 35 years left until you retire and fell you can earn 8.5% interest. How much will you have when you are ready to retire?

To solve, enter 2,000 <PMT>, 35 <N> and 8.5 <I/Y>. Then <CPT> <FV>

Answer: $385,403.35

Calculating the Present Value of an Annuity

You just won the lottery. You will receive $3,500,00 per year for the next twenty-two years. If the appropriate discount rate is 6.5%, what is the value of your winnings?

To solve: 3,500,00 <PMT>, 22 <N> and 6.5 <I/Y>. Then <CPT> <PV>

Answer: $40,373,184.66

Calculating the Amount of an Annuity

You have retired with $1,500,000. If you earn 7.5% interest, how much can you spend each year at for the next 25 years?

To solve: 1,500,000 <PV>, 7.5 <I/Y> and 25<N>. Then <CPT> <PMT>

Answer: $134,566.01

Working with an Annuity Due

An annuity due is similar to an ordinary annuity, with the exception that the payments occur at the beginning of each year. To change to annuity due calculations, hit <2nd> <BGN>. This brings you to the area that allows you to change from end of period payments to beginning of period payments and back. To change, from beginning to end, or end to beginning hit <2nd> <SET>. When you are in the beginning of period mode, the calculator will have a small BGN at the top of the display.

You are going to buy a car for $35,000. You will make 48 monthly payments, with the first payment occurring today. If the loan has an 8.5% APR, how much are your payments?

To solve: <2nd> <BGN>, <2ND> <SET>, 35,000 <PV>, 48 <N>, 8.5 ÷12 = <I/Y>. Then <CPT> <PMT>

Answer: $856.62

NOTE: Don't forget to change the calculator back to end of period mode.

Calculating Unequal Cash Flows

You are going to receive $10,000 in one year, $20,000 in year two and year three and $40,000 in year four. If the interest rate is 9.25%, what is the present value of these cash flows?

To solve: Hit <CF>
{CFo} 0 <ENTER> ↓
{C01} 10,000 <ENTER> ↓
{F01} 1 <ENTER> ↓
{C02} 20,000 <ENTER> ↓
{F02} 2 <ENTER> ↓
{C03} 40,000 <ENTER> ↓
{F03} 1 <ENTER>
then hit <NPV>
{I} 9.25 <ENTER> ↓
<CPT>

Answer: $69,326.38

Remember, {CFo} is the cash flow at time 0. Also, {C**} is the amount of the cash flow and {F**} is the number of equal cash flows of that amount in successive periods. Additionally, to clear previous entries in the Cash Flow work sheet, you must be in the Cash Flow work sheet, then hit <2nd>
<CLR Work>.

Calculating the Effective Annual Rate (EAR)

{NOM} = the APR
{EFF} = the EAR
{C/Y} = the number of compounding periods per year

Your credit card has an 18% APR compounded monthly. What is the EAR?

To solve:
<2nd> <Conv>
<2nd> < CLR Work>   (clears all previous entries in this work sheet)
{NOM} 18 <ENTER> ↓
{EFF} ↓ ↓
{C/Y} 12 <ENTER> ↓ ↓
{EFF} <CPT>
Answer: 19.56%