Texas Instruments BAII PLUS Calculator

Keystrokes for the TI BAII PLUS are shown in the text. However, taking a minute to review the Quik Start section, below, will be very helpful in getting started with your calculator. *Note*: The Quik Start section is also included in Appendix C of the text for the TI BAII PLUS. Following the Quik Start section are some specific keystrokes for using the compound interest formulas of Chapters 10 and 11.

Quik Start

Calculator registers. Most keys have 2 functions. One appears in white on the face of the key. The second function appears in gold above the key. To access the second function, press [2nd] first.

Arithmetic. Arithmetic can be done as shown below. Example: Multiply 1,222 by 32.8

keystrokes	display	explanation
1,222 [×] 32.8 [=]	**40,081.60**	answer

Notice, when keying in 1,222 we did not key in a comma (there is no *comma* key). The comma is shown in keystrokes for clarity and will show up in the calculator display. Also, notice that we did not key in the decimal point when entering 1,222; the calculator presumes there is a decimal point at the far right.

Worksheets. The TI BAII PLUS has two modes of operation: the *standard-calculator mode* and the *worksheet mode* (designed to guide us through special applications). There are 12 worksheets. To access a worksheet, press the key(s) to select the worksheet. For example, to access the amortization worksheet, press [2nd] [AMORT]; to return to the *standard-calculator mode*, press [2nd] [QUIT].

Correcting entries. If we enter a number incorrectly, we can correct our mistake without having to start the problem over again. Pressing the backspace key [⇨] gobbles up the last digit. Pressing [CE/C] clears the entire displayed number.

Changing sign. The sign of a displayed number can be changed by pressing [+/-].

Setting the decimal. To set the decimal at, say, 8 places, press [2nd] [FORMAT] 8 [ENTER] [2nd] [QUIT]. For a floating decimal (in which trailing zeros are dropped), set the decimal at 9 places. If we get an answer in the display but want to view more digits than the current decimal setting will allow, we must first store the displayed number by pressing [STO] 1, then change the decimal setting as outlined above, and finally recall the number by pressing [RCL] 1. For chain calculations, the TI BAII PLUS uses the *internal*, more accurate number—not the displayed number; if we want to use the displayed number rather than the internal number, we "round" the internal number to match the displayed number by pressing [2nd] [ROUND] .

Time-saving registers. Suppose we want to calculate the total monthly rent on a 72-unit apartment building in which 36 units rent for $850 each, 24 rent for $900 each, and 12 rent for $925 each. One approach would be to write down subtotals, then add subtotals:

36 × $850	$30,600
24 × $900	21,600
12 × $925	+ 11,100
Total	**$63,300**

Here are a few approaches that can be used to save time:

keystrokes	display	explanation
use storage registers		
36 [×] 850 [=]	30,600.00	first subtotal
[STO] 1	30,600.00	stored in register 1
24 [×] 900 [=]	21,600.00	second subtotal
[STO] 2	21,600.00	stored in register 2
12 [×] 925 [=]	11,100.00	third subtotal
[+] [RCL] 1	30,600.00	first subtotal, recalled
[=]	41,700.00	result
[+] [RCL] 2	21,600.00	second subtotal, recalled
[=]	**63,300.00**	total
use parentheses		
36 [×] 850 [=]	30,600.00	first subtotal
[+] (24 [×] 900)	21,600.00	second subtotal
[+] (12 [×] 925)	11,100.00	third subtotal
[=]	**63,300.00**	total

Chapters 10 & 11 Compound interest formulas

Using a calculator properly is essential in working with the compound interest formulas of Illustration 10-1. An example will be given for each of the 8 compound interest formulas. We will begin with Formula 1A. Before starting, here are a few things worth noting:

- *There are several ways to do the arithmetic; the keystrokes shown in this section are only one choice.* The keystrokes shown may, in some cases, be longer than another method but are used because the method is considered to be more conceptually sound and easier to remember.
- *Here is a tip:* Try your own keystrokes before looking at ours. If your approach makes sense, use it because it will be easier to remember. If you have difficulty, then review our suggested keystrokes.
- The displayed values shown in the keystrokes have 2 decimal places. Having our decimal set at more or less places will not affect the final answer, provided we use chain calculations (remember that chain calculations use the internal, more accurate value, not the displayed value).

Formula 1A

Example 1 of Unit 10.2

You get an income tax refund of $1,700 and deposit the money in a savings plan for 6 years, earning 6% compounded quarterly. Find the ending balance using compound interest formulas.

$$FV = PV\,(1 + i)^{n} = \$1{,}700\,(1.015)^{24} = \mathbf{\$2{,}430.15}$$

keystrokes	display	explanation
1.015 [y^x] 24 [=]	1.43	1.015 to the 24th power
[×] 1,700 [=]	**2,430.15**	answer

Example 2 of Unit 10.2

Suppose a "wise man" had deposited $1 in a savings account 2,000 years ago and the account earned interest at 2% compounded annually. If the money in the account today were evenly divided among the world's population, how much would each person receive, based on a world population of 7 billion?

$$FV = PV\,(1 + i)^{n} = \$1\,(1.02)^{2000}$$ Then divide by 7,000,000,000.

keystrokes	display	explanation
1.02 [y^x] 2,000 [=]	1.586147 17	account balance, in scientific notation
[÷] 7,000,000,000 [=]	**22,659,247.54**	amount per person

Formula 1B

Example 4, Unit 10.2

You deposit $100 at the end of each year for 4 years, earning 6% compounded annually. Use compound interest formulas to find the balance in 4 years.

$$FV = PMT\left[\frac{(1+i)^n - 1}{i}\right] = \$100\left[\frac{(1.06)^4 - 1}{.06}\right] = \mathbf{\$437.46}$$

keystrokes	display	explanation
1.06 [y^x] 4 [=] [-] 1 [=]	0.26	value of numerator
[÷] .06 [=]	4.37	value inside of brackets
[×] 100 [=]	**437.46**	FV

Formula 2A

Example 1 of Unit 10.3

Your aunt says she will give you $2,430.15 in 6 years. Assuming that you can earn 6% compounded quarterly, what is the real value of her promise, in today's dollars?

$$PV = \frac{FV}{(1+i)^n} = \frac{\$2{,}430.15}{(1.015)^{24}} = \mathbf{\$1{,}700.00}$$

keystrokes	display	explanation
1.015 [y^x] 24 [=]	1.43	value of denominator
[STO] 1	1.43	this value is stored in register 1
2,430.15 [÷] [RCL] 1	1.43	recalled the value
[=]	**1,700.00**	answer

Formula 2B

Example 2 of Unit 10.3

You are selling a valuable coin. You have two offers. The first offer is for $5,500 cash. With the second offer, the buyer will pay you $2,000 at the end of each year for 3 years. Assuming that you can earn 8% compounded annually on your money, which offer is better?

$$PV = PMT \left[\frac{1 - \frac{1}{(1+i)^n}}{i} \right] = \$2{,}000 \left[\frac{1 - \frac{1}{(1.08)^3}}{.08} \right] = \mathbf{\$5{,}154.19}$$

keystrokes	display	explanation
1.08 [y^x] 3 [=]	1.26	1.08 to the third power
[1/*x*]	0.79	1 over (1.08 to the third power)
[+/-]	-0.79	changed the sign
[+] 1 [=]	0.21	value of the numerator
[÷] .08 [=]	2.58	value inside the brackets
[×] 2,000 [=]	**5,154.19**	answer

Formula 3

Example 1 of Unit 11.4

Dale bought a rare baseball card 3 years ago for $1,500. He just sold the card for $2,000 to get some money for his college tuition. What interest rate, compounded annually, did Dale earn on the investment?

$$i = \left(\frac{FV}{PV} \right)^{\frac{1}{n}} - 1 = \left(\frac{\$2{,}000}{\$1{,}500} \right)^{\frac{1}{3}} - 1 = .100642 \approx \mathbf{10.0642\%} \quad \text{(with 4 decimal places)}$$

keystrokes	display	explanation
2,000 [÷] 1,500 [=]	1.33	value inside of parentheses
[y^x] 3 [1/x] [=]	1.10	previous value to the 1/3 power
[-] 1 [=]	0.10	rate, in decimal form, with decimal at 2
[STO] 1	0.10	stored in register 1
[2nd] [FORMAT] 6 [ENTER] [2nd] [QUIT]	0.000000	set decimal at 6 places
[RCL] 1	**0.100642**	rate, in decimal form, with decimal at 6
[2nd] [FORMAT] 2 [ENTER] [2nd] [QUIT]	0.00	put decimal back to 2 places

Formula 4A

Example 2 of Unit 11.1

You want to accumulate $200,000 for retirement in 40 years. You can earn 6.75% compounded monthly. What amount must you deposit at the end of each month in order to accumulate $200,000 in 40 years?

$$PMT = \frac{FV\ (i)}{(1+i)^n - 1} = \frac{\$200{,}000\ (.005625)}{(1.005625)^{480} - 1} = \mathbf{\$81.71}$$

keystrokes	display	explanation
1.005625 [y^x] 480 [=] [-] 1 [=]	13.77	value of denominator
[STO] 1	13.77	stored the value
200,000 [×] .005625 [=]	1,125.00	value of numerator
[÷] [RCL] 1	13.77	denominator, recalled
[=]	**81.71**	answer

Formula 4B

Example 2 of Unit 11.2

Suppose you have accumulated $500,000, perhaps from many years of savings or from an inheritance. You put the money in a savings plan earning 6% compounded monthly. You want the plan to last 40 years. How much can you withdraw at the end of each month?

$$PMT = \frac{PV\ (i)}{1 - \frac{1}{(1 + i)^n}} = \frac{\$500{,}000\ (.005)}{1 - \frac{1}{(1.005)^{480}}} = \mathbf{\$2{,}751.07}$$

keystrokes	display	explanation
1.005 [y^x] 480 [=]	10.96	1.005 to the 480th power
[1/x]	0.09	1 over (1.005 to the 480th power)
[+/-]	-0.09	changed the sign
[+] 1 [=]	0.91	value of denominator
[STO] 1	0.91	stored the value
500,000 [×] .005 [=]	2,500.00	value of numerator
[÷] [RCL] 1	0.91	recalled the denominator
[=]	**2,751.07**	answer

Formula 5

Example 3 of Unit 11.1

You want to start a restaurant business and estimate it will take $28,000 to get started. You currently have $3,000 and can deposit an additional $425 at the end of each month. If your savings will earn 9% compounded monthly, in how many months can you start your business?

For Formula 5 we must use proper sign convention for PV, FV, and PMT:

PV = negative $3,000 (negative because you pay this amount into a savings plan)
FV = $28,000 (positive because you will get this amount back from the savings plan)
PMT = negative $425 (negative because you pay this amount into a savings plan)

$$n = \frac{-\ln\left(\dfrac{PV + (\frac{PMT}{i})}{\frac{PMT}{i} - FV}\right)}{\ln(1+i)} = \frac{-\ln\left(\dfrac{-\$3{,}000 + \left(\frac{-\$425}{.0075}\right)}{\frac{-\$425}{.0075} - \$28{,}000}\right)}{\ln(1.0075)} = \mathbf{46.83\ months}$$

keystrokes	display	explanation
Step 1: Compute and store (-$425 over .0075)		
425 [+/-] [÷] .0075 [=]	-56,666.67	value of (- $425 over .0075)
[STO] 1	-56,666.67	stored in register 1
Step 2: Compute and store the bottom half of the numerator		
[-] 28,000 [=]	-84,666.67	value of the bottom half of the numerator
[STO] 2	-84,666.67	stored in register 2
Step 3: Compute and store the value of the entire numerator		
[RCL] 1	-56,666.67	recall value of (- $425 over .0075)
[-] 3,000 [=]	-59,666.67	value of the top half of the numerator
[÷] [RCL] 2	-84,666.67	recall bottom half of the numerator
[=]	0.70	total value inside of large brackets
[LN]	-0.35	the natural log of the previous value
[+/-] [STO] 3	0.35	entire numerator stored in register 3
Step 4: Compute and store the value of the main denominator		
1.0075 [LN]	0.01	the natural log of 1.0075
[STO] 4	0.01	main denominator stored in register 4
Step 5: Get answer		
[RCL] 3	0.35	recall the value of the entire numerator
[÷] [RCL] 4	0.01	recall the value of the main denominator
[=]	**46.83**	answer