Texas Instruments 30X IIS Calculator

Keystrokes for the TI-30X IIS are shown for a few topics in which keystrokes are unique. Start by reading the Quik Start section. Then, before beginning a specific unit of the text, check to see if this includes keystrokes for that unit. Going through the keystrokes before class will help, especially if your instructor cannot include instructions for the TI-30X IIS during class.

Quik Start

Calculator registers. Most keys have 2 functions. One appears in white on the face of the key. The second function appears in color above the key. To access the function appearing in gold, 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. 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.

Correcting entries. Pressing [DEL] clears one digit at a time. Pressing [CLEAR] clears the display.

Negative numbers. To enter a negative number, press the (-) sign on the bottom row of keys. Notice, this is different than the minus key located above the "+" symbol.

Setting the decimal. To change the decimal setting, press [2nd] [FIX], then type the number of decimal places you want (from 0 to 9). For a floating decimal, press [2nd] [FIX] [**.**].

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 two other approaches:

keystrokes	display	explanation
use storage registers		
36 [×] 850 [=]	30,600.00	first subtotal
[STO] *Select A* [=]	30,600.00	stored in register A
24 [×] 900 [=]	21,600.00	second subtotal
[STO] *Select B* [=]	21,600.00	stored in register B
12 [×] 925 [=]	11,100.00	third subtotal
[+] [2nd] [RCL] *Select A* [=]	Ans+30,600.00	first subtotal, recalled
[=]	41,700.00	result
[+] [2nd] [RCL] *Select B* [=]	Ans+21,600.00	second subtotal, recalled
[=]	**63,300.00**	total
use parentheses		
36 [×] 850 [=]	30,600.00	first subtotal
[+] (24 [×] 900) [=]	52,200.00	second subtotal
[+] (12 [×] 925) [=]	**63,300.00**	total

Unit 3.1 Mathematical symbols and expressions

Example 2 Use a calculator to find the value of: **a.** 23^2 **b.** 4^5

keystrokes	display	explanation
23 [x^2] [=]	**529.00**	result
4 [∧] 5 [=]	**1,024.00**	result

Unit 4.2 The percent formulas

Example 1 (Arithmetic portion) Multiply 5,600 by 70%.

keystrokes	display	explanation
multiply by a decimal number		
5,600 [×] .70 [=]	**3,920.00**	answer
multiply by a percent		
5,600 [×] 70 [2nd] [%] [=]	**3,920.00**	answer

Unit 4.3 Increase and decrease problems

Example 1 You buy a TV for $350. You must also pay sales tax of 6%. First find the amount of sales tax. Then, determine the total amount you must pay.

keystrokes	display	explanation
350 [×] 6 [2nd] [%] [=]	**21.00**	sales tax
[+] 350 [=]	**371.00**	total amount due

Example 3 You retain a real estate agent to help sell your home. The home sells for $200,000, and you have agreed to pay your real estate agent a 7% commission. First find the commission. Then, determine the net amount you will receive after the commission.

keystrokes	display	explanation
200,000 [×] 7 [2nd] [%] [=]	**14,000.00**	commission
[×] [(-)] 1 [=]	-14,000.00	getting ready to subtract 14,000 from 200,000
[+] 200,000 [=]	**186,000.00**	net, after the commission

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 [∧] 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 [∧] 2,000 [=]	1.59×10^{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 [∧] 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 [∧] 24 [=]	1.43	value of denominator
[STO] A [=]	1.43	this value is stored in register A
2,430.15 [÷] [2nd] [RCL] A	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 [÷] 1.08 [∧] 3 [=]	0.79	1 over (1.08 to the third power)
[×] [(-)] 1 [=]	-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
[∧] (1 [÷] 3) [=]	1.10	previous value to the 1/3 power
[-] 1 [=]	0.10	rate, in decimal form, with decimal at 2
[2nd] [FIX] 6	**0.100642**	rate, in decimal form, with decimal at 6
[2nd] [FIX] 2	0.10	put decimal back at 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 [∧] 480 [=] [-] 1 [=]	13.77	value of denominator
[STO] [ENTER]	13.77	stored the value in register A
200,000 [×] .005625 [=]	1,125.00	value of numerator
[÷] [2nd] [RCL]	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 [÷] 1.005 [∧] 480 [=]	0.09	1 over (1.005 to the 480th power)
[×] [(-)] 1 [=]	-0.09	changed the sign
[+] 1 [=]	0.91	value of denominator
[STO] [ENTER]	0.91	stored the value in register A
500,000 [×] .005 [=]	2,500.00	value of numerator
[÷] [2nd] [RCL]	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)

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

keystrokes	display	explanation
Step 1: Compute and store (-$425 over .0075)		
[(-)] 425 [÷] .0075 [=]	-56,666.67	value of (- $425 over .0075)
[STO] *Select A* [ENTER]	-56,666.67	stored in register A
Step 2: Compute and store the value of the denominator inside of large brackets		
[-] 28,000 [=]	-84,666.67	value of the denominator inside of large brackets
[STO] *Select B* [ENTER]	-84,666.67	stored in register B
Step 3: Compute and store the value of the main denominator		
[LN] 1.0075 [=]	0.01	the natural log of 1.0075
[STO] *Select C* [ENTER]	0.01	stored in register C
Step 4: Compute the value of total numerator		
[2nd] [RCL] *Select A*	-56,666.67	value of (- $425 over .0075)
[-] 3,000 [=]	-59,666.67	value of numerator inside of large brackets
[÷] [2nd] [RCL] *Select B*	-84,666.67	denominator inside of large brackets, recalled
[=] [=]	0.70	total value inside of large brackets
[STO] *Select D* [ENTER]	0.70	stored in register D
[LN] [2nd] [RCL] *Select D*	0.70	ready to find the natural log of the previous value
[=] [=]	-0.35	the natural log
[×] [(-)] 1 [=]	0.35	value of the total numerator
Step 5: Find answer		
[÷] [2nd] [RCL] *Select C*	0.01	recalled the natural log of 1.0075
[=] [=]	**46.83**	answer