Calculator Ultimate Manual

Calculator Ultimate's functions are divided into five main Tabs. The contents of each Tab are shown at the following matrix:

Tab	Functions
Basic	Basic arithmetic calculations
Sci	Trigonometric functions, logarithms, factorial, roots,powers
Eq	2nd and 3rd degree equations, systems of unknowns, derivatives, integrals,
Conv	Conversions of numerous units
Matrix	Matrix operations

Note: Apart from the obvious an additional way to switch between tabs is by dragging your finger horizontally.
Note: Input screen has a bar, so you can see earlier commands.

Basic Tab

C   button erases the last registration
Cl   button erases the last line with a single click <u>and</u> clears the input screen with a long click
(and **)**   buttons are useful for solving numeric expressions
=   button solves the numeric expression and the result appears at the input screen
Also with a <u>long click</u>, **./E** button takes an <u>integral</u> number and raises number 10 to that number's power.
e.g. the sequence **3**, **./E** *(long click) ,* **-**, **4**, **=** *will return 3.0E-4 (=0.0003)*

Note: For speed purposes, powers with ./E button do not need parentheses (for example, like above, typing 3E-4 is correct), unlike all the other exponent calculations in the Sci Tab. For example you must type 6*8^(-6) or else a 'Math or Syntax Error' message will appear!

Sci Tab

C   same with the button of the first Tab
Ans   button is used when you want to recall the result of the last calculation
π   button represents the mathematical constant pi (3.14159265359)

e   button represents the Euler's number (2.718281828459)

x!   give an integer (or an <u>expression</u> that gives an integer) and then push this button to calculate its factorial

*e.g. the sequence **4**, **x!**, = will return 24*

*additionally the sequence (, **3**, +, **1**,), **x!**, = will also return 24*

x^2
and
x^n

*e.g. the sequence **2**, x^n, **3**, = will return 8*

mod   returns the remainder of the division of two numbers

*e.g. the sequence **5**, **mod**, **3**, = will return 2*

sin/asin,   buttons solve with a simple click trigonometric functions <u>and</u>

cos/acos   with a long click inverse trigonometric function (e.g. arc cosine)

and

tan/atan

sinh,   buttons solve hyperbolic functions

cosh

and

tanh

$\sqrt{\ }$ and   help the calculation of n-th root of a number

$\sqrt[n]{\ }$

*e.g. the sequence $\sqrt[n]{\ }$, **3**, =, **27,),** = will return 3 (cube root of 27)*

ln,   buttons return the logarithm of a number

log   ln is the natural logarithm, log is the logarithm with base 10,

$\log_2$ $\log_2$ is the logarithm with base 2 and logx calculates the

and   logarithm of a number in any given base

logx

*e.g. the sequence **logx, 6, =, 12,),** = will return 1.386852807235 (logarithm of number 12 where 6 is the base)*

Note: For roots and logarithms a convention is used. Commands like rootb6v(12) and logb3v(27) are interpreted as follows: after the letter b comes the base of logarithm (or root) that has been given and after the letter v comes the value (number) of which we want to find its logarithm (or root).

!!! Between the parentheses it is possible to place not only single numbers but also expressions.

Eq Tab

<u>Solution of 2nd and 3rd degree polynomial equations.</u>

When the **ax²+bx+c** or **ax³+bx²+cx+d** buttons are pushed, only the first 3 Tabs are enabled in order to enter the values of the parameters (a,b,c,d). Enter each parameter and then push the button **Enter Value**. The solutions of the polynomials will be given on the input screen.

System of unknowns.

Calculator Ultimate gives the capability to solve systems from 2 to 4 unknowns with the form:

A1x1+B1x2+C1x3+D1x4=E1   where x1,x2,x3,x4 are the unknowns
A2x1+B2x2+C2x3+D2x4=E2
A3x1+B3x2+C3x3+D3x4=E3
A4x1+B4x2+C4x3+D4x4=E4
A5x1+B5x2+C5x3+D5x4=E5

Just push the button **System of unknowns** and a popup window will appear. First enter the number of unknowns with the μενου με τελείες. After that enter all the parameters of the system. In the end press **OK** and the solution will be given on the input screen.

Del   button allow the user to erase the last element added in a field
Clear   just push it in order to erase all the fields

Derivatives.

With the button **df(x)/dx** it is possible to calculate the derivative of a function at specific derivative points. When you press the button you are being transported at the first Tab and only the first 3 Tabs are enabled. Note that some buttons have different functions (e.g. **CL** has been replaced y X button). After you enter function f(x) press **Enter Value** button. Then enter derivative point and **Enter Value** button again. The result will appear on the input screen.

Note: The 'X' symbolizes the variable of a function.
Note: Be careful cause the calculator don't recognize expressions such as 6x.
You must type 6*x or else a 'Math or Syntax Error' message will appear!
Note: In order to calculate derivatives Calculator Ultimate uses numerical differentiation technique (five point method).

Definite Integrals

With the button **∫f(x)dx** it is possible to calculate the definite integral of a function. First, when you press the button you are being transported at the first Tab and only the first 3 Tabs are enabled. Enter lower and upper limit of the integral (press **Enter Value** button each time). After that, enter function f(x) and press **Enter Value** button. The result will appear on the input screen.

Note: In order to calculate integrals Calculator Ultimate uses Simpsons'Rule.

<u>Complex numbers to their polar form and vice versa</u>
After you press **a+bi→r<θ** or **r<θ→a+bi** button enter real (a) and imaginary (b) parts of complex number or magnitude (r) and argument (θ) of the polar form (press **Enter Value** button each time). The converted form will appear on the input screen.

Clear Equation   If you change your mind (you don't need to solve an equation anymore) or you want to exit equation mode press this button and you will be directed to the first Tab.

Conv Tab

Calculator Ultimate has been designed to be user friendly and **Conv** Tab (tab which makes unit conversions) doesn't make an exception. Just push the button with the measurement you want to convert and then choose the couple of units you wish. Then fill the value of one unit and press Convert so the value of the other unit is displayed.
*e.g the sequence **length, meters ←→ feet, 1 (at the meters field), Convert** will return 3.280839895013123 feet.*

Note: At the last popup window if you push the checkable menu next to the units you can convert them with the desired prefixes (e.g. you can convert centimeters to picoinches immediately)!!!
Note: 'Dec/Bin/Oct/Hex' and 'Angle' buttons are slightly different. You don't need to choose a couple of units since the calculator converts all of them simultaneously.

Matrix Tab

The last Tab allows the user to perform matrix operations

Matrix A   buttons display a popup window where you can
and   initialize the 2 matrices. The popup window gives
Matrix B   several choices. With Calculator Ultimate size of a
                          matrix could be between 1-5 rows and columns (change
it with **Size** button).
At the popup window the buttons **Copy to A** and **Copy to B** copy the matrix which is initialized to the other matrix.

Note: If we don't fill any field of a matrix and press OK button the empty fields will take the value '0'.

Swap A-B   when pressed it replaces Matrix A with Matrix B and vice versa. This is very useful since matrix multiplication is not commutative (AxB not equal with BxA).

A^t   calculates the transpose matrix of A
a*A   computes multiplication of Matrix A by a number
det(A)   calculates the determinant of Matrix A
A^{-1}   computes the inverse matrix of A
A+B   computes the addition of Matrices A and B
AxB   computes the multiplication of Matrices A and B

Changing the Settings

Pressing the **Menu** button and choosing **Settings** give the option to change the following:

The checkbox **Enable animations** when checked enables some visual effects (e.g. the buttons' fade-in,fade-out when the selected Tab is changed). These effects slightly slows the calculator, so if you want max performance you should uncheck it.

Decimal digits, and **Equations' decimal digits**, seek bars give the option to choose the desirable number of decimal digits with which the answer appears, in normal calculations, and in calculations of Eq Tab respectively.

Partitions is a value which influences the calculation of the integrals. When a relatively big value is chosen, the accuracy of the calculation is increased but also its mathematical complexity (meaning more calculation time). Default value is set to 200.

Note: If you want settings to return to default values press Reset button.

Saved screens

Calculator ultimate give the option to save your calculations and recall them again in the future.

Pressing **Store** button can save your calculations from your main screen. You can store as many screens as you like.

When you want to recall one of them please choose it and press **Restore**.

When you want to delete one of them please choose it and press **Delete**.

If you want to delete all your saved screens press **Delete All**.