



Full Scientific Calculator

Brief User Guide

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FSC Version 1.75

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Overview

Many users who contacted us urged that we publish a manual that de-mystifies many of the functions available in this calculator. However, many were used to conventional scientific calculators that just skimmed the top of their needs in functionality — with the advent of the features available in the app — they were overwhelmed.

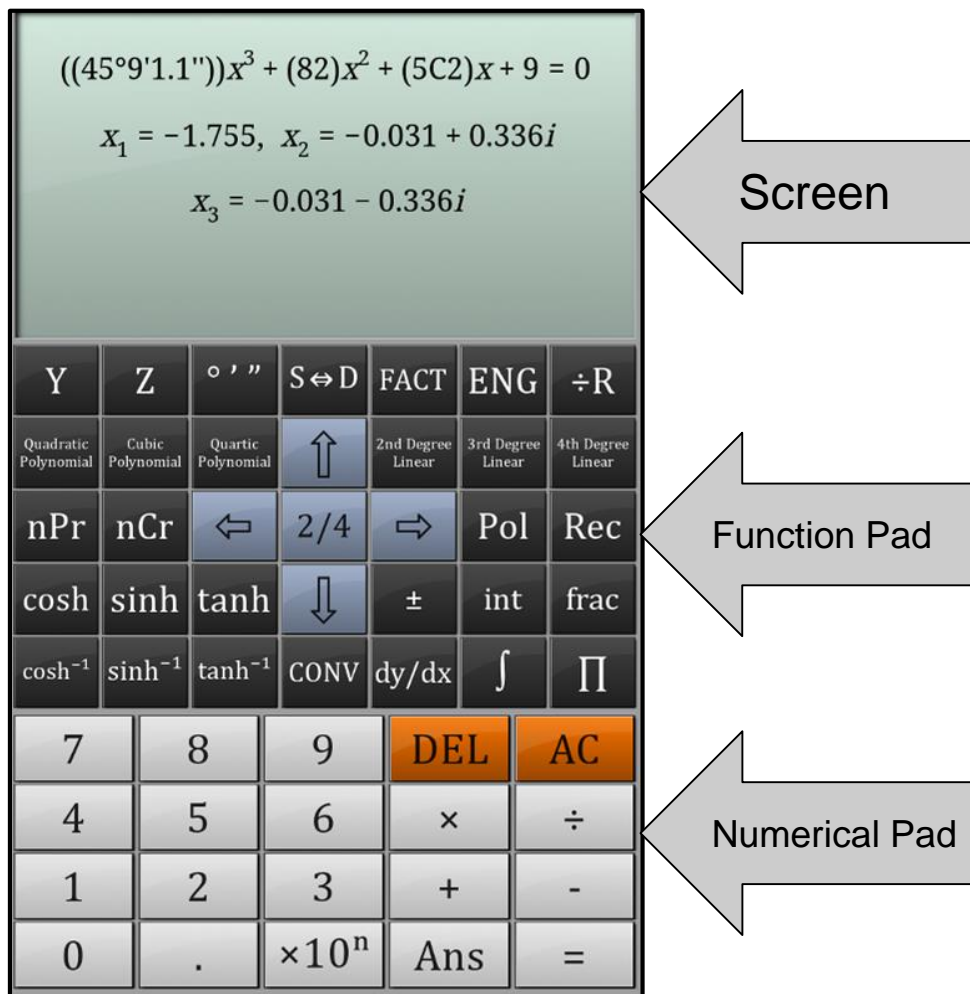
This guidebook aims to cover all the features that may be unknown to you. It does not cover conventional arithmetic functions such as **addition, subtraction, multiplication, or division.**

Likewise, it will not cover other commonplace subjects such as **fractions, denominators, numerators, square roots, orders, powers, logarithms, engineering notation, inversions, trigonometric functions, hyperbolic trigonometry, limited integration, polar & rectangular coordinates, sexagesimals, complex numbers, factorials and numerical differentiation.**

Subjects such as **matrices, base-n numbers, statistics, linear equations, polynomial equations, conversions, constants, common denominators, and logical operators (OR, AND, XOR, NOT)** will have their input syntax explained, but not their mathematical principles or operation.

If you are interested in a detailed rundown of the common features, [this CASIO manual is completely analogous to the app.](#)

Introduction



The calculator consists of a **dynamic screen**, **4 function pads**, and a **numerical pad**. The screen adjusts the size of the font automatically based on the length of the equation to fit it in. The bulk of the features are stored in the rest of the quickly-accessible pages.

The calculator has an answer **memory bank** which you can navigate through using the **up** and **down arrow** buttons when the equation is either empty or displaying an answer.

You can also edit your previously saved answers by pressing the **left** or **right arrow** buttons when viewing one:

Calculator screen showing the equation $((45^\circ 9' 1.1''))x^3 + (82)x^2 + (5C2)x + 9 = 0$ and its roots: $x_1 = -1.755$, $x_2 = -0.031 + 0.336i$, $x_3 = -0.031 - 0.336i$.

Calculator keypad buttons: Y, Z, o' ", S \leftrightarrow D, ENG, ÷R, Quadratic Polynomial, Cubic Polynomial, Quartic Polynomial, 2nd Degree Linear, 3rd Degree Linear, 4th Degree Linear, nPr, nCr, \leftarrow , 2/4, \rightarrow , Pol, Rec, cosh, sinh, tanh, \downarrow , \pm , int, frac, \cosh^{-1} , \sinh^{-1} , \tanh^{-1} , CONV, dy/dx, \int , Π .

Press to edit equation

Calculator screen showing the equation $((45^\circ 9' 1.1''))x^3 + (82)x^2 + (5C2)x + 9 = 0$ and its roots: $x_1 = -1.755$, $x_2 = -0.031 + 0.336i$, $x_3 = -0.031 - 0.336i$.

Calculator keypad buttons: Y, Z, o' ", S \leftrightarrow D, ENG, ÷R, Quadratic Polynomial, Cubic Polynomial, Quartic Polynomial, 2nd Degree Linear, 3rd Degree Linear, 4th Degree Linear, nPr, nCr, \leftarrow , 2/4, \rightarrow , Pol, Rec, cosh, sinh, tanh, \downarrow , \pm , int, frac, \cosh^{-1} , \sinh^{-1} , \tanh^{-1} , CONV, dy/dx, \int , Π .

Press to go to previous or next answer

Most of the features are configurable and you are able to edit them in the **settings** menu available on the 4th **function pad**.

Function Pad 1/4

The calculator has a total number of 4 function pads (6 if you count the **constants** and **conversion** pages), and can be scrolled through using the middle button which expresses the current **function pad** page number:

X	Σ	%	π	e	e^n	10^n
ln	log	\log_n	↑	$\sqrt{\quad}$	$\sqrt[3]{\quad}$	$\sqrt[n]{\quad}$
$\frac{\square}{\square}$	$\square \frac{\square}{\square}$	←	1/4	⇒	x!	x^{-1}
cos	sin	tan	↓	x^2	x^3	x^n
\cos^{-1}	\sin^{-1}	\tan^{-1}	M	M+	()

The middle button in the **function pad**, $\frac{1}{4}$, indicates that you are on the 1st page out of a total of 4. Pressing that button will move the **function pad** to the next page & set of functions, and so on, until you reach the 4th **function pad**. After that, the **function pad** resets to the first page.

Additionally, you can traverse **function pads** by swiping the keyboard left or right.

The features available on the first page are not detailed due to their commonplacy and intuitive notation.

Function Pad 2/4

Y	Z	° ' "	S↔D	FACT	ENG	÷R
Quadratic Polynomial	Cubic Polynomial	Quartic Polynomial	↑	2nd Degree Linear	3rd Degree Linear	4th Degree Linear
nPr	nCr	←	2/4	⇒	Pol	Rec
cosh	sinh	tanh	↓	±	int	frac
\cosh^{-1}	\sinh^{-1}	\tanh^{-1}	CONV	dy/dx	∫	∏

The second **function pad** consists of secondary common scientific functions as well as some exclusive features. The

Y	Z
---	---

 buttons are variables which can be used during your equation. You will be prompted to input their values after you press the

=

 button.


The

S↔D	FACT	ENG
-----	------	-----


 buttons are functions that are used after you press the

=

 button to display an answer. They cannot be used during the composition of the equation.

To compute a **linear** or **polynomial** equation, press the respective button and input all the parameters by navigating with the **arrow keys**. Alternatively, you can press the  button while there are still empty fields to skip to that field.

Y	Z	° ' "	S ↔ D	FACT	ENG	÷R
Quadratic Polynomial	Cubic Polynomial	Quartic Polynomial	↑	2nd Degree Linear	3rd Degree Linear	4th Degree Linear
nPr	nCr	←	2/4	⇒	Pol	Rec
cosh	sinh	tanh	↓	±	int	frac
cosh ⁻¹	sinh ⁻¹	tanh ⁻¹	CONV	dy/dx	∫	∏

The  button opens the **conversions** menu:


in ▶ cm	oz ▶ g	ft ▶ m	lb ▶ kg	m ▶ ft	g ▶ oz	cm ▶ in
yd ▶ m	atm ▶ Pa	mile ▶ km	mmHg ▶ Pa	km ▶ mile	Pa ▶ atm	m ▶ yd
n-mile ▶ m	hp ▶ kW	acre ▶ m ²	Pa ▶ mmHg	m ² ▶ acre	kW ▶ hp	m ▶ n-mile
gal (US) ▶ L	kgf·m ▶ J	gal (UK) ▶ L	kg ▶ lb	L ▶ gal (UK)	J ▶ kgf·m	L ▶ gal (US)
pc ▶ km	km/h ▶ m/s	J ▶ cal	CONV	cal ▶ J	m/s ▶ km/h	km ▶ pc


The **conversion** variables act as a pre-defined variable inside parenthesis, therefore, the side where the conversion appears is irrelevant.

Function Pad 3/4

Gini Coefficient	Trimean	Midrange	Skewness	Kurtosis	Standard Deviation	Relative Standard Deviation
Median	Range	Variance	↑	Mean Deviation	Standard Mean Error	Root Mean Square
Mean	Sum of Squares	←	3/4	→	Interquartile Mean	Interquartile Range
Abs	gcf	lcm	↓	cot	sec	csc
,	Ran#	RanInt	CONST	\cot^{-1}	\sec^{-1}	\csc^{-1}


The 3rd **function pad** mainly consists of features that require more than two fields to yield a valid answer. Therefore, unlike most other functions, they won't enclose themselves in parenthesis automatically.

In order to use such functions, you have to use the  button to separate each field in the function.

Enter one or more fields (there is no limit), where each field is separated by a comma using the  button.

The same applies to all the **statistics** functions which require multiple fields.

Gini Coefficient	Trimean	Midrange	Skewness	Kurtosis	Standard Deviation	Relative Standard Deviation
Median	Range	Variance	↑	Mean Deviation	Standard Mean Error	Root Mean Square
Mean	Sum of Squares	←	3/4	→	Interquartile Mean	Interquartile Range
Abs	gcf	lcm	↓	cot	sec	csc
,	Ran#	RanInt	CONST	\cot^{-1}	\sec^{-1}	\csc^{-1}

The  button opens up the **constants** menu:

mp	α	re	$\mu\mu$	u	C	μ_0	g	G
mn	μN	λc	μp	F	σ	G_0	b	k_e
me	μB	$\lambda c p$	μe	e	R	Z_0	C_1	R_K
$m\mu$	γp	$\lambda c n$	μn	N_A	Vm	ϵ_0	C_2	G_F
h	\hbar	$R\infty$	k	CONST	atm	ϕ_0	a_0	E_h

FSC features 44 scientific constants, namely:

(m_p) proton mass	(m_n) neutron mass
(m_e) electron mass	(m_μ) muon mass
(a) Bohr radius	(h) Planck constant
(μ_N) nuclear magneton	(μ_B) Bohr magneton
(\hbar) Planck constant, rationalized	(α) fine structure constant
(r_e) classical electron radius	(λ_c) Compton wavelength
(λ_{cp}) proton Compton wavelength	(R_∞) Rydberg constant
(λ_{cn}) neutron Compton wavelength	(u) atomic mass constant
(γ_p) proton gyromagnetic ratio	(F) Faraday constant
(μ_n) neutron magnetic moment	(e) elementary charge
(μ_p) proton magnetic moment	(R) molar gas constant
(μ_e) electron magnetic moment	(N_A) Avogadro constant
(μ_μ) muon magnetic moment	(k) Boltzmann constant
(C) speed of light in vacuum	(atm) standard atmosphere
(σ) Stefan-Boltzmann constant	(ϵ_0) electric constant
(μ_0) magnetic constant	(Φ_0) magnetic flux quantum
(Z_0) characteristic impedance of vacuum	(G_0) conductance quantum
(g) standard acceleration of gravity	(R_K) von Klitzing constant
(G) Newtonian constant of gravitation	(G_F) Fermi coupling constant
(b) Wien's displacement law constant	(C_1) first radiation constant
(C_2) second radiation constant	(k_e) Coulomb's constant
(V_m) molar volume of an ideal gas	(E_h) Hartree energy

Function Pad 4/4

3×3 Matrix	3×2 Matrix	3×1 Matrix	1×3 Matrix	1×2 Matrix	1×1 Matrix	Divide
2×3 Matrix	2×2 Matrix	2×1 Matrix	↑	Add	Subtract	Multiply
Scalar	Power	←	4/4	⇒	Base-n Number	NOT
Inverse	Diagonal	Transpose	↓	OR	AND	XOR
A	B	C	Settings	D	E	F



The fourth and final **function pad** consists of high-end functions and the **settings** button.

Inside the settings menu, you will find configurations that will help adjust the app's behavior to your preference. The settings range from the calculative precision of certain functions to mundane things like vibration, tips & ad types.

The rest of the functions in this pad involve in the calculation of both **matrices** and **base-n** equations. Most calculators use an arcane method for calculating these, and differ from the simply powerful solution proposed in the app.

3×3 Matrix	3×2 Matrix	3×1 Matrix	1×3 Matrix	1×2 Matrix	1×1 Matrix	Divide
2×3 Matrix	2×2 Matrix	2×1 Matrix	↑	Add	Subtract	Multiply
Scalar	Power	←	4/4	→	Base-n Number	NOT
Inverse	Diagonal	Transpose	↓	OR	AND	XOR
A	B	C	Settings	D	E	F


To calculate a **matrix** equation, press one of the **matrix** grid sizes to your choosing (2x2, 2x3, 3x3...), fill up its fields, then choose the operation you would want to perform. Let's assume you want to add two **matrices**; after you filled up the first

matrix, press the  button, and then include another **matrix** by choosing another grid size (usually of the same dimensions) and fill its fields as well. Once you have a minimum of two **matrices**, you can either add more **matrices** and operations, or press the  button to view the result.

Some **matrix** operations, such as **inversion** and **transposition**, don't require a second **matrix** for a valid result, and can be followed by another operation such as **addition** or **subtraction**.



Remember that you must use the arithmetic operation buttons in the **function pad**, not the ones in the **numerical pad** when

dealing with equations that consist of either **base-n** or **matrix** calculations.

Calculating **base-n** equations isn't much different. First, you must enter a **base-n** number using the  button and fill the blanks, which are the **value** and **base** fields. Next, you can use the same arithmetic operations used in the **matrix** calculations (the included **add, subtract, multiply and division** operations appearing in the **function pad**).

You can apply arithmetic operations between numbers of different bases, and the result will always display in the **base** of the final number you entered.

Finally, the **base conversion** works on a similar principle. After you enter one **base-n** number and specified its parameters

(**value** and **base**), press the  AGAIN, what you will have now is your previous number listed as a **value** for a new number with a blank **base**. Enter any **base**, and press the  button to have it **converted** to the specified **base**.

This wonderfully versatile system allows you to experiment with many different combinations.

Full Feature List

This chapter contains all the features that can be found within the calculator. Besides the basic arithmetic functions, any feature not stated in this chapter explicitly is not available in the app. Note that individual complex numbers are not available in the app — only in the specific contexts listed in certain functions.

If you find a discrepancy in the list, please inform us at jjsoftware@tech-center.com.

- Fully-formatted math
- Quadratic, cubic and quartic polynomial equations with complex numbers
- 2nd, 3rd and 4th degree linear equations
- Normal and hyperbolic trigonometry, complete with inversion.
- Normal and inverse cotangent, secant & co-secant functions
- Unlimited number of digits
- Regular, improper and mixed fractions
- Sexagesimal/DMS (degrees, minutes, seconds) calculations & conversions
- Decimal to/from fraction conversion
- Result history up to 1000 answers

- Integration and differentiation calculus equations
- Matrices & vectors, up to 3x3 cells with transposition, inversion, power, scalar, diagonal, and arithmetic, with complex numbers
- Algebraic equations
- 34 Metric/Imperial conversions
- 44 scientific constants
- Boolean algebra, including NOT, OR, AND, and XOR
- Conversions and calculations between base 2 to 16
- Custom, natural and base-10 logarithms
- 4-directional navigation
- Answer display in decimal, proper & improper fractions
- Descriptive statistics functions, including: mean, median, range, midrange, variance, gini coefficient, sum of squares, trimean, skewness, kurtosis, mean deviation, standard deviation, relative standard deviation/variance coefficient, standard mean error, root mean square (RMS), interquartile mean, interquartile range. All answers are in "sample" format, not "population".
- Multi-threaded calculations
- Scientific and engineering notation
- Factorial decomposition
- Permutations & Combinations
- Least common modifier and greatest common factor functions

- Modulus/remainder function
- Multiple angle types, including degrees, radians and gradians
- Factorials
- Ordinary, cubic and custom roots
- Random integers & decimals
- Plus/minus sign
- Absolution
- Summation function
- Product summation function
- Answer memorization
- Natural constants
- Frac & Int functions
- Percents

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