



Solution Lite 2.0
SOLUTION TLB GROUP
User's Manual

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Introduction

Solution Lite is the powerful scientific calculator for mobile devices running Symbian OS Nokia Series 60 3rd Edition. Solution Lite supports lots of functions and provides smart interface which makes using Solution Lite quick and easy.

This document describes all the Solution Lite features and abilities and the right way to use them.

In the 2nd chapter – Quick Start – you can find a detailed description of calculating $\exp(5)$. This simple example will introduce the basic interface features.

In the 3rd chapter – User's Interface – the interface utilities that are used in the whole program are widely discussed. The main idea of Solution Lite interface is in fact this simply one – to enter any data press navigation centre key first and look at the appeared dialog if any.

In the 4th chapter you can find full description and detailed how-to-use instructions for the Scientific Calculator instrument.

In the 5th chapter – More – you can find descriptions of some more utilities and settings that can be used in Solution Lite.

We hope that you would find Solution Lite useful and worthwhile application.

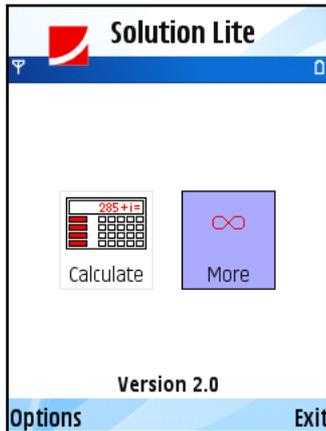
Good luck!



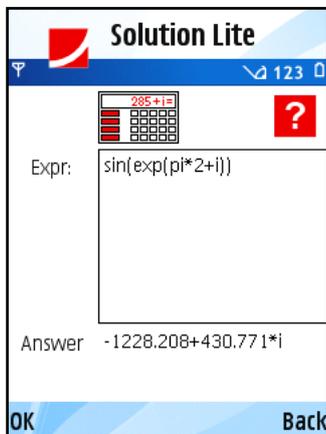
Quick Start

How to calculate $\exp(5)$?

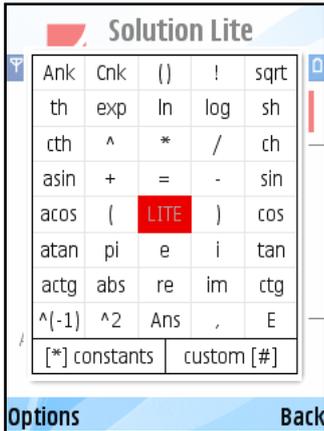
The interface of Solution Lite is simple and provides a lot of opportunities at the same time. The best thing is just to try it on the simple example and get the main ideas. So let's calculate $\exp(5)$!



In the *Main Menu* you see two icons that represent two main parts of Solution Lite program.



Select *Calculate* icon using navigation keys. Press navigation centre key to open *Calculate* dialog.



To enter new formula in *Expr* box press navigation centre key and in the appeared *Functions Menu* dialog select *exp* using navigation keys.

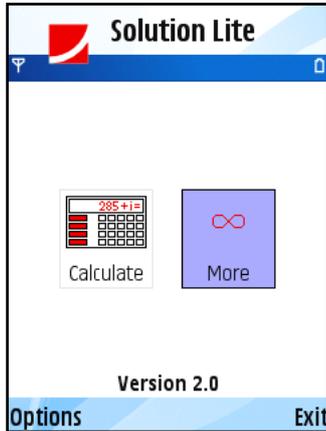
Press navigation centre key and see “exp()” added to *Expr* box. Press [5] button on keyboard. Now formula in *Expr* box is “exp(5)” and that is precisely what we wanted. So press navigation centre key two more times and get the first result – *exp(5)* was calculated and the answer - 148.41316 - appeared in *Answer* box!

To view help topic select the [?] icon in the upper-right corner and press navigation centre key.

Now you are ready to start using Solution Lite! To learn all the details concerning Solution Lite instruments read the following chapters.



User's Interface



Main Menu

In the *Main Menu* you see two icons that represent two main parts of Solution Lite program.

The first item is *Calculate* – you can evaluate any expression using this scientific calculator that supports even complex computations. You may create your own functions and remember frequently used constants and then refer to them by name.

The second item is *More* – there are several utilities and settings that could be used in Solution Lite.



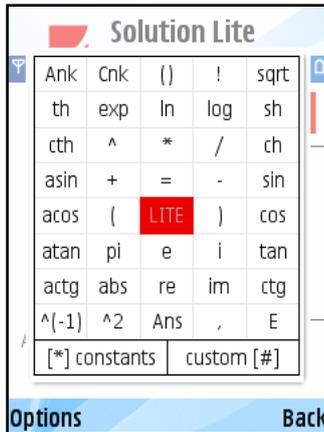
Help

There is a help topic for each instrument of Solution Lite program.

Help is available in any dialog. To view help topic for an instrument (plot, calculate etc) open the necessary utility and select [?] icon if it's available and press navigation centre key. In some menus (e.g. *Functions Menu*) there is no such icon. In this case use *Options/Help* to open the related help topic.



Functions Menu



Functions Menu is the main tool that makes using Solution Lite quick, smart, nice and easy. This menu is available nearly in every instrument dialog – to call it just press navigation centre key. The main idea is simple – *Functions Menu* indicates what you are able to do in the particular situation, e.g. which function you can use and which one you can not. For mobile phones it’s a well-known problem to enter formulas fast. The main purpose of this utility is, of course, to make entering formulas as fast as possible using only navigation keys and numbers.

The principle – “To enter any data press navigation centre key first” – is something like Solution Lite interface general rule.

Functions Menu also provides the very important opportunity – creation of user-defined functions and quick access to previously saved ones. If expressions are big and frequently used in calculations it takes a lot of time to print them each time you need to. So this is time for creating a custom function or save a constant.

How to use

Standard items

To enter standard function or constant value select the necessary one using navigation keys and press the navigation centre key. Any standard item that can’t be used in the particular case is marked grey.

User-defined items

You can define your own constant/function using *Constants* and *Custom Functions* menus respectively. To call *Constants* menu press [*]. To call *Custom Functions* menu press [#]. Use these utilities to store any constants and functions that are frequently used. Give them unique names and then use them in any formula. To learn more about creation, changing and using constants and custom functions open the appropriate menu and call *Options/Help* there.



Details

Here are brief descriptions of every *Functions Menu* standard item.

x – independent variable

pi, e – constants.

sin, cos, tan, ctg, asin, acos, atan, actg – trigonometric functions

sh, ch, th, cth – hyperbolic functions

exp - exponent

ln – natural logarithm

log – logarithm of base 10

sqrt – square root of a number

abs – absolute value

i – imaginary unity

re, im – real and imaginary parts of a complex number

+ - ^ * / – arithmetic operations

! – factorial function

Ank = n!/(n-k)! – combinatorial function

Cnk = n!/(k!(n-k)!) – combinatorial function

() , (,) – brackets

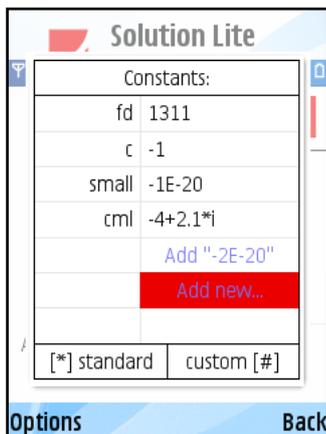
, – delimiter between arguments in multidimensional user-defined function

A – numeric parameter in plotter

E – scientific notation sign, e.g. 2E3=2*10³=2000

Ans – the last answer.

Constants Menu



Use this utility to store any constant values that are frequently used in calculations. Give them unique names and use these names in any formula you like. This menu contains the full list of saved constants and provides quick access to them.

How to use

Create new

Select “Add new...” item or use *Options/Edit/Add new...* Enter the name and the value to be saved in the appeared dialogs. Some of the names (e.g. pi or e) are not allowed.

Usage in formula

To use saved constant in arbitrary formula set the cursor over constant’s name in the list (left column) using navigation keys. Press navigation centre key or use *Options/OK*.

Change existing

To change constant (name or value) set the cursor over the value of this constant in the list (right column) using navigation keys. Press navigation centre key or use *Options/Edit/Change*. In the appeared dialogs enter new name and then new value.

Delete

To delete constant select it in the list (any column) and press [C] or use *Options/Edit/Delete*.

Order

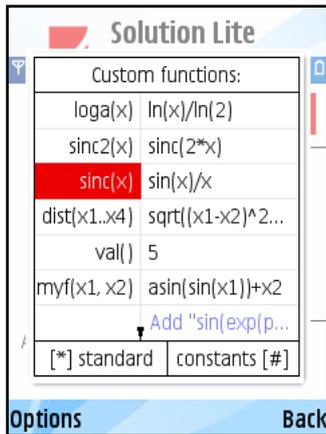
Constants are listed in the same order as they were saved. To change current position of constant select it and call *Options/Edit/Order*.

More

The last numerical result can be easily added to constants list. It appears as special button in *Constants* menu. There is also possibility to save the last result of any calculation directly to constants list. Set the cursor over the Answer box in parent dialog and press navigation centre key twice.



Custom Functions Menu



Use this utility to store any functions that are frequently used in calculations. Give them unique names and use these names anywhere you need. This menu shows the full list of user-defined functions and provides quick access to them. User-defined functions can be multidimensional.

How to use

Create new

Select “Add new...” item or use *Options/Edit/Add new...* Enter the unique name and the formula to be saved in the appeared dialog. Some of the names (e.g. sin or exp) are not allowed. To create multidimensional function use several independent variables – the names of them should be “x1”, “x2” etc. See the example below for details. The current function from parent dialog can be easily saved. It appears as special button in *Custom Functions* menu.

Usage in formula

To use saved function set the cursor over it’s name in the list (left column) using navigation keys. Press navigation centre key or use *Options/OK*. If function is multidimensional it is added to parent dialog with brackets and commas. You should specify all the necessary arguments. See the example below for details.

Change existing

To change function (name or formula) set the cursor over the it’s formula (right column in the list) using navigation keys. Press navigation centre key or use *Options/Edit/Change*. In the appeared dialog enter new name and then new formula.

Delete

To delete function select it in the list (any column) and press [C] or use *Options/Edit/Delete*.

Order

Functions are listed in the same order as they were saved. To change current position of function select it and call *Options/Edit/Order*.



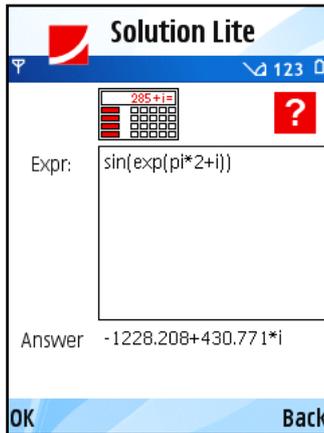
Multidimensional function example

Suppose you want to save the function $\text{fun}(x_1, x_2) = \sin(x_1) + x_2$. Select “Add new...” item and enter the function’s name fun. Enter the formula (*Functions Menu* is available) $\sin(x_1) + x_2$. Press OK or press centre key twice.

To use new function select its name and press centre key. In the parent dialog $\text{fun}(,)$ appears. The comma separates arguments. Enter the values for both arguments (that can be numbers, other functions, variables or expressions) and get the answer. $\text{fun}(0, 1)$ provides 1, $\text{fun}(\text{asin}(1), -1)$ provides 0.



Scientific Calculator



This is powerful scientific calculator with real and complex computations support.

Supported functions

1. Standard functions (with complex-variable support): +, -, /, *, ^, sqrt(x), sin(x), cos(x), tan(x), ctg(x), arcsin(x), arccos(x), arctan(x), arcctg(x) exp(x), log(x), ln(x), abs(x), re(x), im(x), sh(x), ch(x), th(x), cth(x).
2. Combinatorial calculus: ! – factorial, $A(n,k) = n!/(n-k)!$, $C(n,k) = n!/(k!(n-k)!)$.
3. User-defined functions and constants – Create your own functions (possibly multidimensional) and remember constants that are frequently used in calculations.

Complex computations

All the standard functions support complex computations. To enter a complex number use *Function Menu* item “i” that represents imaginary unity.

How to use

For entering $F(x)$ formula quicker press navigation centre key and use the appeared *Functions Menu*. This menu provides quick access to standard and user-defined functions and constants. To learn more about *Functions Menu* call *Options/Help* there.

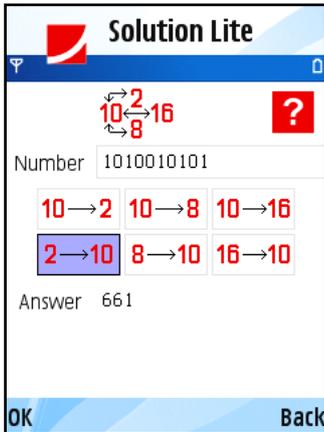
When you finish entering data press navigation centre key two more times to get the answer that will appear in the Answer box below.

By default pressing [#] causes entering “.” symbol. To switch to Alpha mode use *More* menu. By default everything is calculated in radians. To switch to degrees use *More* menu.



More

Conversions



You can use this utility for converting values between various numeration systems. Conversions from decimal numeration system return the positive decimal numbers in a true representation; the whole negative decimal numbers – in a complement representation. The fractional negative decimal numbers are not represented in the complement form for not creating contradictions.

Also there are functions for converting values from binary, octal or hexadecimal numeration to decimal. These functions return the positive decimal numbers.

How to use

Enter the number you want to convert to another notation (press navigation centre key to enter letters) and then use special buttons that represent six available operations. In the first row there are “decimal to binary form”, “decimal to octal form”, “decimal to hexadecimal form”. In the second row there are “binary to decimal form”, “octal to decimal form” and “hexadecimal to decimal form”. Select the necessary operation and press navigation centre key. Answer appears in the box below.

Examples

Number **4.5**
 [10->2]
 Answer **100.1**

Number **-1**
 [10->2]
 Answer **1111**

Number **abcdef**
 [16->10]
 Answer **11259375**

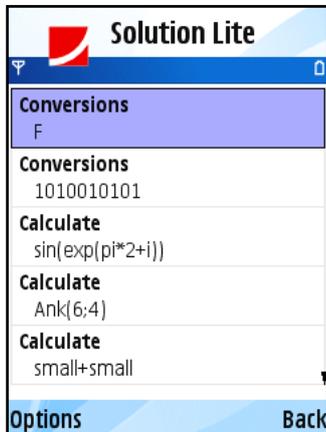
Number **1000**
 [10->16]
 Answer **3e8**

Number **11001**
 [2->10]
 Answer **25**



History

This utility provides quick access to the last 30 performed actions.



How to use

The first line of each history item represents utility used and the second line represents object (function, matrix etc) upon which the action took place.

Select the necessary item using navigation keys and press navigation centre key. The proper already-filled dialog opens.

Additional Settings

Reset colors sets default values to all graph colors.

Units of Angle changes the behavior of trigonometric functions. You can choose between radians (default) and degrees computations.

Alpha Mode sets the F(x) editor mode. Digits mode “123” is set by default, letters mode “Abc” is recommended for users of QWERTY-keyboard.



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