

Solver v1.1.0
for
Macintosh / Power Macintosh
©1995 by S.C. Sinclair
All Rights Reserved.

Thanks for downloading Solver 1.1.0! This document serves as the instruction manual for Solver, and **MUST** be included if Solver is uploaded to any on-line or BBS service.

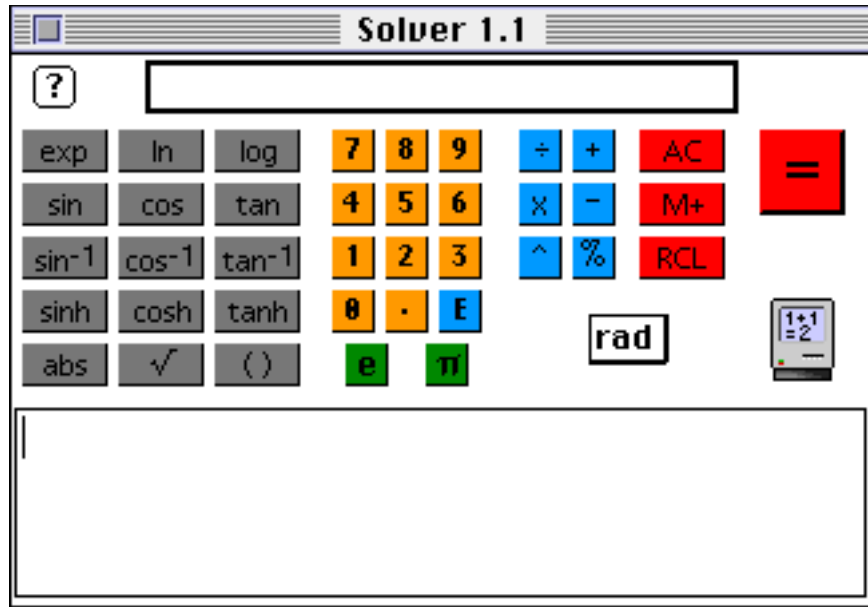
Description

Solver is intended to serve as a replacement to the Desktop Calculator that comes standard with all Macintosh computers. Therefore, Solver runs on any standard color Macintosh and is also "accelerated" for Power Macintosh. If you are familiar with spreadsheets, Solver uses notation very similar to that. If you are not familiar with spreadsheets, don't worry - Solver is very easy to use! In fact, ease of use was a primary goal in creating this program.

Highlights of Solver 1.1 include:

- **Much** improved 3-D color interface with on-line help reference
- 17 digit precision
- Automatic parenthesis insertion for built-in functions
- Output all operations and results to file for later retrieval (registered versions only)
- Accelerated for Power Macintosh
- Large, easy-to-read display & buttons
- Supports standard Clipboard operations Cut, Copy, Paste... as well as a standard calculator "memory" function.

Solver 1.1 is shareware, meaning that you can use it freely, but it does not become fully functional until you register as a user. Registration consists of filling out the registration form included, then mailing it to the author, Stefan Sinclair, along with the \$5 registration fee (form is located at the end of this document). I will then promptly mail or e-mail (your choice) you a valid registration code which will allow you to instantly upgrade your shareware version to a fully functional version. If for some reason you cannot handle the meager \$5 registration fee, let me know and maybe we can work something out.



Functionality

To use Solver, you enter numerical expressions via the keyboard or using the special function buttons on the main window. Before listing each of the functions and what they do, I will list some basic syntax rules that are used by Solver.

- Numbers can be entered in standard format with no commas (i.e., 51187.9056), or in exponential notation (i.e., 3.456E-67, -4.678e12, etc....) Use the minus sign (-) to indicate a negative number or a negative power of ten. Also note that UPPER and lower case letters are acceptable, even for function names, as long as case is consistent for each individual word. For example:

COS(3.14159) , 1.09e45 * 234.56E-12 <- OK
 sIn(3.14159) <- NOT OK

Usually you will probably just want to use the function buttons, especially if you are a slow typist like me.

You must always use parenthesis to specify a function's argument, for example:

SIN(3.14159)

evaluates the trigonometric sine of 3.14159 in radians or degrees, depending on the current state of the rad/deg button. You can create rather complex mathematical expressions with this notation. For example,

sin(ln(exp((1+2)/3))) gives the answer of
 1.570796... if in "radians" mode, or
 90.0000... if in "degrees" mode.

As a general rule, the overall length of the expression in the expression editor cell

cannot exceed a total length of 230 characters, including parenthesis, letters, numbers, etc.. This is just about how many characters it would take to completely fill the editor cell window (no coincidence!).

Parenthesis can also be used to specify the order of operations to be performed in your entry, as was done in the above example. For example, consider the following:

$$6 + 2 * 6 - 3 = 15 \text{ but } 6 + 2 * (6-3) = 12$$

Also, the numerical precision of Solver is limited to 17 places, so an error message will be generated (non-fatal; don't worry!) if you try to use numbers longer than this. An example of such a number would be

123456789.12345678987654 <- ERROR WILL BE GENERATED

In addition, the maximum representable number, either input or as output, is

1.18973 E+4932

If you enter a number larger than this, or the answer generated by your expression is larger than this, you will probably see the following output:

-2147483648.-2147483648.-21474

Operators & Functions

Now you will be introduced to the mathematical operators and functions that Solver has to offer. First are the numerical operators, which are entered with the keyboard or the special buttons:

Multiplication * or ' x ' (button)	Multiply one number by another number	$6 * 2$ (12)
Division / or ' ÷ ' (button)	Divide one number by another number	$6 / 2$ (3)
Exponentiation ^	Raise one number to a power	$6 ^ 2$ (36)
Addition +	Add two numbers together	$6 + 2$ (8)
Subtraction -	Subtract a number from another number	$6 - 2$ (4)
Modulus %	Find remainder of integer division	$6 \% 4$ (2)


NOTE: The modulus operator, "%", is not to be confused with a percentage sign! The modulus returns the remainder of an integer division operation. If you use non-integer numbers with the modulus operator, the numbers will be truncated to integers. For example, $3.23 \% 2.45 = 1$ (the operation performed is $3 \% 2 =$ remainder of 1).


Here are the built-in functions included with Solver, entered with either the buttons (automatic parenthesis insertion) or by keyboard (manually insert parenthesis).

ABS, abs	Absolute value of argument	ABS(-1.23) = 1.23
COS, cos	Cosine of argument in radians or degrees	COS(0) = 1 (radians)
SIN, sin	Sine of argument in radians or degrees	SIN(1) = .84147... (radians)
TAN, tan	Tangent of argument in radians or degrees	TAN(1) = 1.5574... (radians)
COSH, cosh	Hyperbolic cosine of argument	COSH(2) = 3.76219...
SINH, sinh	Hyperbolic sine of argument	SINH(2) = 3.62686...
TANH, tanh	Hyperbolic tangent of argument	TANH(2) = .96402...
ACOS, acos cos-1 (button)	Arc-cosine of argument given in radians or degrees	ACOS(1) = 0 (radians or degrees)
ASIN, asin sin-1 (button)	Arc-sine of argument given in radians or degrees	ASIN(0) = 0 (radians or degrees)
ATAN, atan tan-1 (button)	Arc-tangent of argument given in radians or degrees	ATAN(0) = 0 (radians or degrees)
EXP, exp	exponential function of argument	EXP(1) = 2.7182818...
LN, ln	Natural logarithm of argument	LN(2.7182818) = .9999...
LOG, log	Base-10 logarithm of argument	LOG(10) = 1
SQRT, sqrt	Square-root of argument	SQRT(9) = 3

Additional Features

You will also notice some other less obvious buttons on the main window. Here is what they are used for:

 - hit this to evaluate the currently entered expression.

 - toggle between using radians and degrees for trigonometric functions. The current mode is displayed directly inside this button.

 - clear the expression editor cell. Functionally equivalent to picking "Select

All"

and then "Clear" from the "Edit" menu.

M+ - Stores number currently displayed in answer cell in "memory".

RCL - Places number in memory (if any) into editor cell at current I-beam location.

π - enters the number "pi" as 3.141592654

e - enters the number "e" as 2.718281828 (NOTE - more accurate method would be to enter EXP(1)).

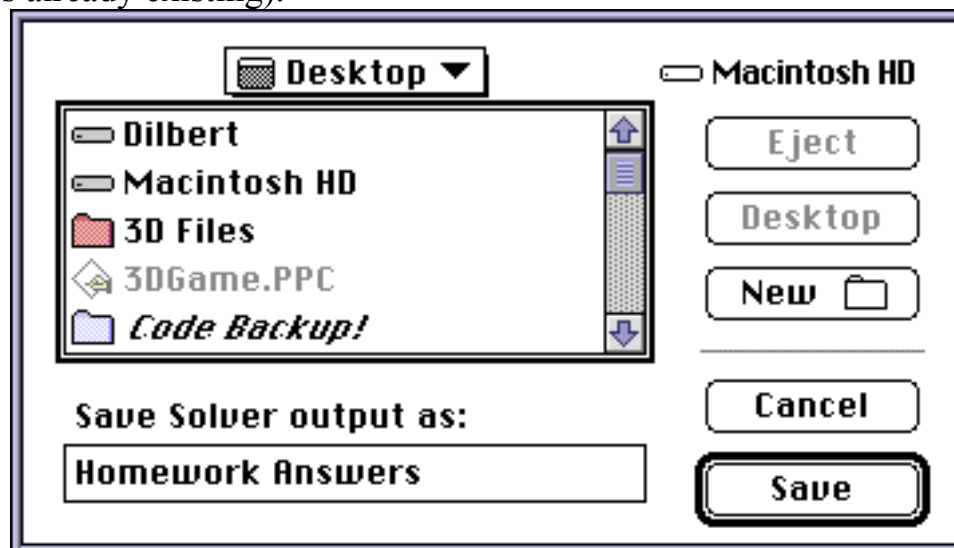
E - Inserts exponential notation symbol E, e.g.. $100 = 1E2$, $1E-3 = 0.001$

() - Inserts parenthesis, and places I-beam between them.

[?] - Brings up the on-line help window, which is a summary of what each button does

(New for version 1.1)

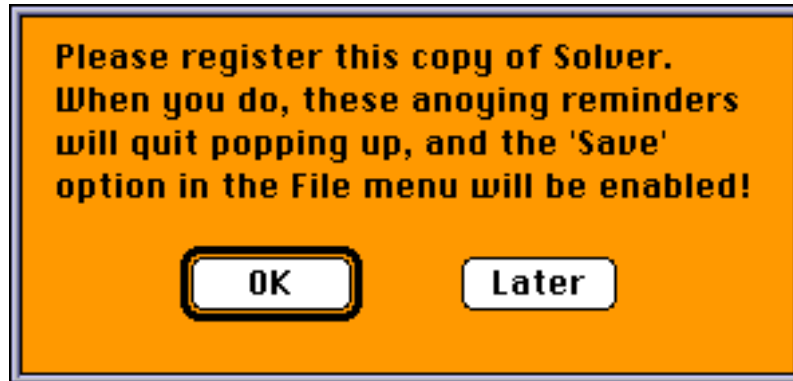
There are also a menu option worth explaining in greater detail, "Save to File..." in the "File" menu. This feature is available only to registered users. Selecting this will allow you to save all proceeding entries and answers to a text-type file. This can be of great benefit to somebody such as a student who needs to perform a large number of mathematical operations and record them... The file you save to should be a new file (name it something that will not conflict with other files already existing).



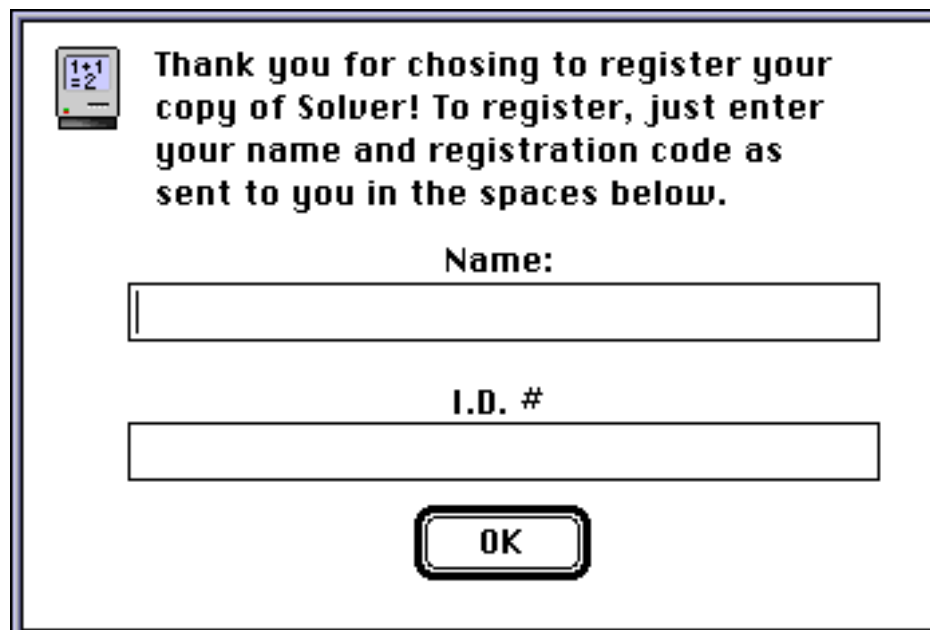
You can only save to one file each time you run the Solver application, so if you desire multiple output files, you must unfortunately quit and restart Solver each

time. The resulting file can be opened with any text-editor (even PC ones), such as TeachText, SimpleText, MS Word, etc..

To register, fill out the included registration form & send it along with \$5 per copy to the address listed. Then , I will send you a registration code you can use to enter into the Registration dialog box. You get to the Registration dialog box by hitting the "OK" button whenever this alert pops up:



That will get you to the registration dialog box, shown here:



Final Words

Due to subtle 'inaccuracies' in the ways which all computers perform floating point arithmetic, you will occasionally come across answers that are off by just a little bit from what you might expect. I'm talking about VERY minute errors. For example, enter the expression "2.01 - 2", and you get "0.009999999999999999", which is essentially 0.01. Don't be alarmed by this.

Finally, should you encounter any really bad errors that you just can't resolve on your own, let me know via e-mail at "TrickyS@aol.com" and I will get to the bottom of it. I'm happy to say that I have yet to receive a single bug report of any kind for the previous release of this program, Solver 1.0 (although this version has some interface related bugs fixed which I personally discovered).

About the Author

I am a 23 year old mechanical engineer in Lincoln, NE and graduate of the University of Nebraska - Lincoln. I've been programming for various computers since the early '80s, and for the Macintosh for a little over 1^{1/2} years, though I've been using Macintosh computers since 1986. P.S., there is an easter egg (of sorts) in this program!

License Agreement

Copies of Solver 1.1 may be on more than one computer, provided that only one copy is running at any given time. For each additional copy that is running at the same time, an additional registration must be purchased.

Disclaimer

I, Stefan C. Sinclair, make no warranties, either express or implied, with regard to the included software and its fitness for any particular purpose. By using the afore-mentioned software, you agree to accept full responsibility for any damage or data loss that may result.

Registration

To register, just fill out this form (or send the requested information) and mail along with \$5 registration fee (please make any checks payable to the author (that's me) **Stefan C. Sinclair**) to the following address:

**Stefan C. Sinclair
1318 Three Pines Ct.
Lincoln, NE 68510**

Number of Copies _____ x \$5 = _____ **Total Cost**

Your Name: _____

E-mail: _____ (only if needed)

Street: _____ (only if needed)

City: _____ (only if needed)

State/Province: _____ (only if needed)

Country: _____ (only if needed)

Would you like me to send registration code to: [] E-Mail Address [] Postal Address

(Check only one)