

SimpleCmplx: Elementary calculations with complex numbers

The screenshot displays the SimpleCmplx software interface with several functional panels:

- Graph:** A complex plane showing vectors for $Z_1 = 4+2i$ and $Z_2 = 1-i$. The resultant vector is labeled $R_5(4+2i)$.
- Zs:** A table listing complex numbers and their polar representations:

	cart.	polar
a	4+2i	4.47, 26.6°
b	1-1i	1.41, -45°
c	0-3i	3, -90°
- Entrv / edition of Z:** Input fields for a complex number $a+bi$ and its polar form r, φ° . It includes a 'decimals' dropdown set to 2 and a 'n' dropdown set to 3.
- Unary operations:**
 - Power of Zⁿ:** Shows $Z = 4+2i$ (polar: 4.47, 26.6°) raised to the power $n=3$, resulting in $Z^n = 16+88i$ (polar: 89.44, 79.7°).
 - n Root:** Shows the 5th root of $Z = 4+2i$ (polar: 4.47, 26.6°), resulting in five roots:

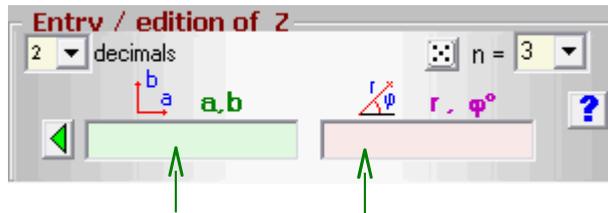
Root	Cartesian	Polar
1	1.34+0.12i	1.35, 5.3°
2	0.3+1.32i	1.35, 77.3°
3	-1.16+0.69i	1.35, 149.3°
4	-1.01-0.89i	1.35, 221.3°
- Binary operations:** Shows $Z_1 = 4+2i$ and $Z_2 = 1-i$ with a table of operations:

operation	cartesian	polar
Z1+Z2	5+1i	5.1, 11.3°
Z1-Z2	3+3i	4.24, 45°
Z1*Z2	6-2i	6.32, -18.4°
Z1/Z2	1+3i	3.16, 71.6°
- Combined operations:** A calculator-style interface with a numeric keypad and a 'String of operations' field containing $a*b/c$. The result is shown in both Cartesian (-2+0.67i) and Polar (2.11, 161.6°) forms.

1. [Entry / generation and edition of complex numbers](#)
2. [Operations:](#)
 - 2.1. [Unary operations: raising to a power and root of index n](#)
 - 2.2. [Binary operations: addition, subtraction, product and division](#)
 - 2.3. [Combined operations.](#)
3. [Saving and recovering results](#)

1. Entry / generation, edition of complex numbers

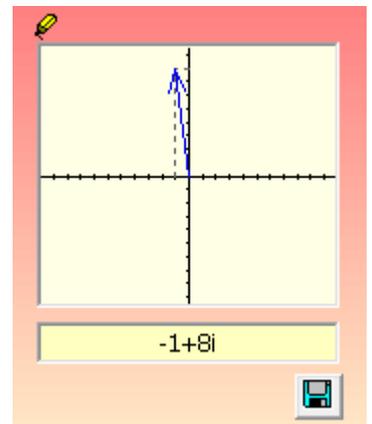
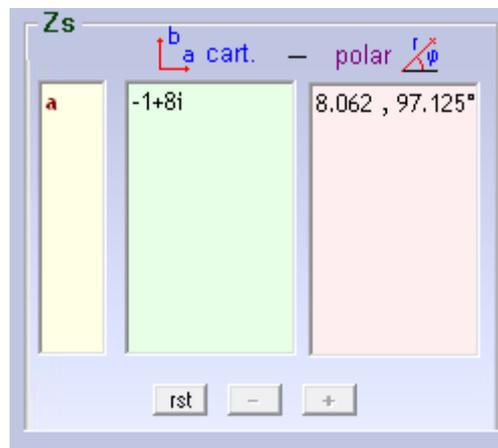
Entry:



It can be in cartesian (a,b) or polar (r,φ) modes and components must be separated with *comas* or *spaces*.

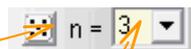
Then click on  or **return** in the keyboard.

The complex is added to the list of available complex numbers and identified with a letter.



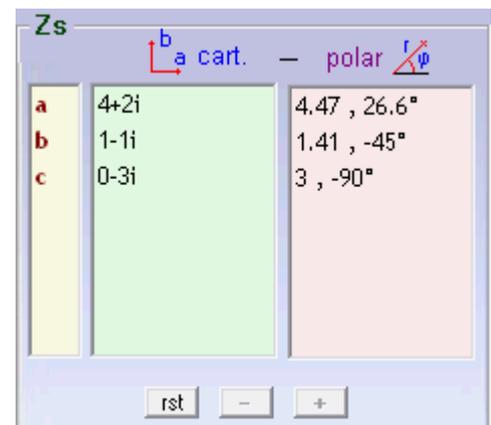
Its graph is shown also.

Generation of n random complexes:



Clicking in the dice button **n** (selected from the list)

random complexes are generated and direct added to the available complex numbers list.



Clicking in any complex number selects it and then you can:

Modify (edit) it: in the "Entry textboxes" and reincorporate it with **return** or 

Eliminate it: with  button or pressing **Supr**

Or deselect it, to enter a new complex, by means the  button.

The whole list may be reseted clicking on the  button.

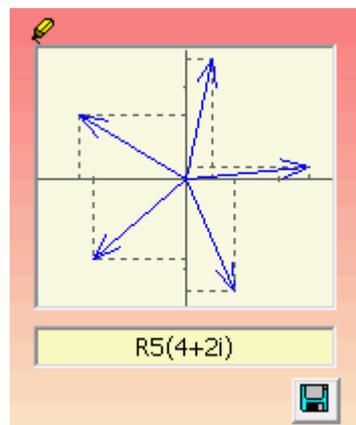
Note: Only the complexes of this list can be used in the next operations.

2. Operations :

2.1. Unary operations: raising to a power and root of index n

Should be selected:

- The identifier of the complex (a,b,...) from the correspondig list (Z:...).
- The exponent (for the power) or the index (for the root) from the lists " n = "



Unary operations:

Power of Z^n

Z: a $n = 3$

cartesian $\begin{matrix} b \\ a \end{matrix}$ polar $\begin{matrix} r \\ \phi \end{matrix}$

Z = 4+2i 4.47 , 26.6°

$Z^n = 16+88i$ 89.44 , 79.7°

n Root

Z: a $n = 5$

cartesian $\begin{matrix} b \\ a \end{matrix}$ polar $\begin{matrix} r \\ \phi \end{matrix}$

Z = 4+2i 4.47 , 26.6°

$\sqrt[n]{Z} =$

1.34+0.12i	1.35 , 5.3°
0.3+1.32i	1.35 , 77.3°
-1.16+0.69i	1.35 , 149.3°
-1.01-0.89i	1.35 , 221.3°

2.2. Binary operations: addition, subtraction, product and division

Operands are selected from the lists **Z1** and **Z2**

Results of the operations are shown at the table

[Graphs](#): they are shown/hide with the option checkbox

Binary operations: Z1 @ Z2

Z1 a 4+2i 4.47 , 26.6°

Z2 b 1-i 1.41 , -45°

operation	cartesian $\begin{matrix} b \\ a \end{matrix}$	polar $\begin{matrix} r \\ \phi \end{matrix}$
Z1+Z2	5+1i	5.1 , 11.3°
Z1-Z2	3+3i	4.24 , 45°
Z1*Z2	6-2i	6.32 , -18.4°
Z1/Z2	1+3i	3.16 , 71.6°

Graphs

They can be resized with the mouse or maximized for more detail.

2.3. Combined operations

Combined operations a,b,...

a String of operations $(b+c')/a$ =

cartesian 0.111-0.444i

polar 0.458 , -75.963°

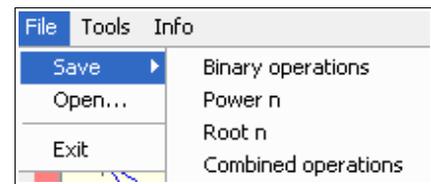
The string of operations can be edited with the keyboard r with the attached buttons

^ : power ' : conjugated (ex: a' = a conjugated), E: 10^ (ex: 2.7E5 = $2.7 \cdot 10^5$)

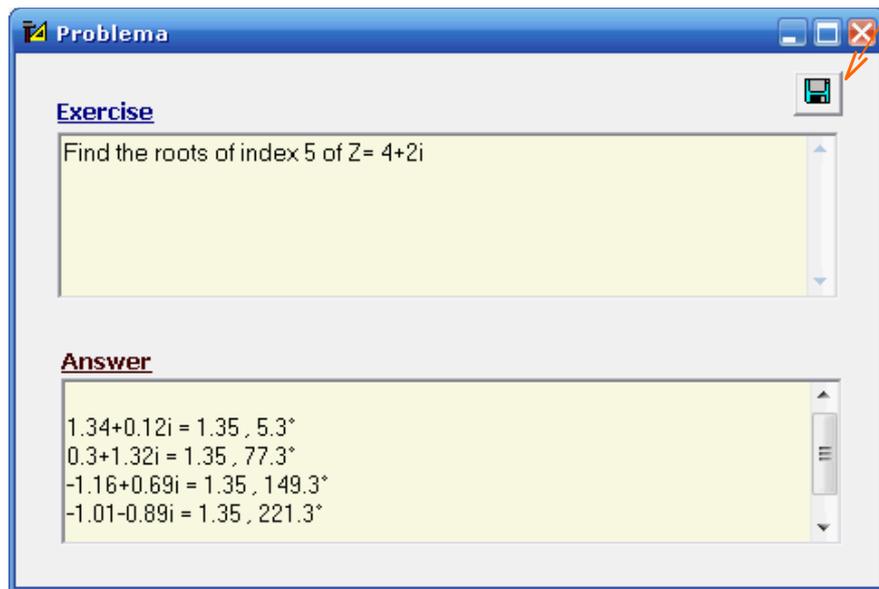
In any case results can be saved as an "exercice" clicking on

3. Saving and recovering results

In addition to use of  results can be saved also from the menu:

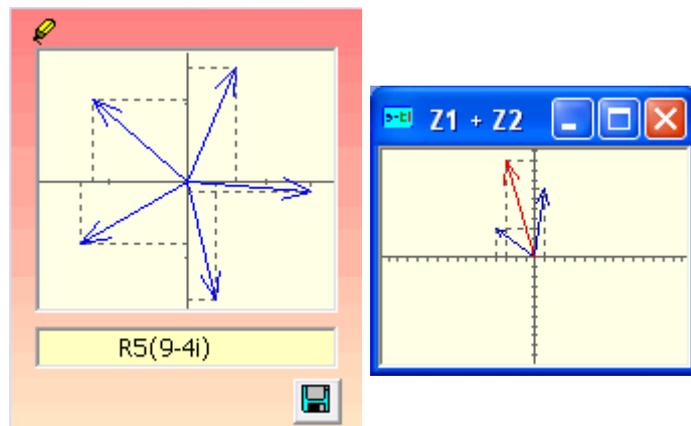


Before, a preview of the exercise is shown. And then, you can edit it and/or save it definitively



Graphics can be saved in **jpg** format by means of  or, in the binary operations, as an option when saving results.

(The user can combine results saved as text with graphs in an *.rtf*, *.doc*, *Open Office...file*)



All files saved can be recovered by means the menu option ...

