

SimpleCmplx: Elementary calculations with complex numbers

The screenshot shows the SimpleCmplx software interface with several panels:

- Graphics Panel:** A complex plane with a vector labeled $R5(9-4i)$.
- Zs Panel:** A table listing complex numbers in Cartesian and Polar forms.

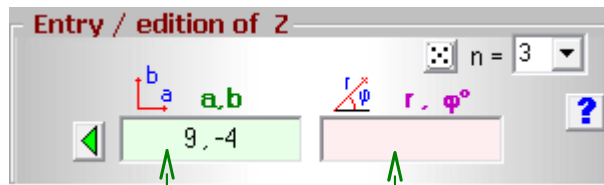
	cart.	polar
a	0+9i	9, 90°
b	9-4i	9.848, -23.962
c	-5-5i	7.071, -135°
- Entry / edition of Z Panel:** Fields for entering a complex number $a+bi$ or in polar form r, ϕ° . A dropdown menu shows $n=3$.
- Unary operations Panel:**
 - Power of Zⁿ:** Shows $Z = 9-4i$ (cartesian) and $9.85, -23.96^\circ$ (polar). The result is $Z^n = 65-72i$ (cartesian) and $97, -47.92^\circ$ (polar).
 - n Root:** Shows $Z = 9-4i$ (cartesian) and $9.85, -23.96^\circ$ (polar). The result is $\sqrt[n]{Z} = 1.574-0.132i$ (cartesian) and $1.58, -4.79^\circ$ (polar).
- Binary operations Z1 @ Z2 Panel:**
 - $Z1 = 9-4i$ (cartesian) and $9.85, -23.96^\circ$ (polar).
 - $Z2 = -5-5i$ (cartesian) and $7.07, -135^\circ$ (polar).
 - Operations table:

operation	cartesian	polar
$Z1 + Z2$	4-9i	9.848, -66.037°
$Z1 - Z2$	14+1i	14.035, 4.085°
$Z1 \cdot Z2$	-64.999-25.000i	69.641, -158.962°
$Z1 \div Z2$	-0.499+1.3i	1.392, 111.037°
- Combined operations a,b,... Panel:** A calculator interface with a string of operations $(b+c)/a$ and a numeric keypad. The result is $0.111-0.444i$ (cartesian) and $0.458, -75.963^\circ$ (polar).

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

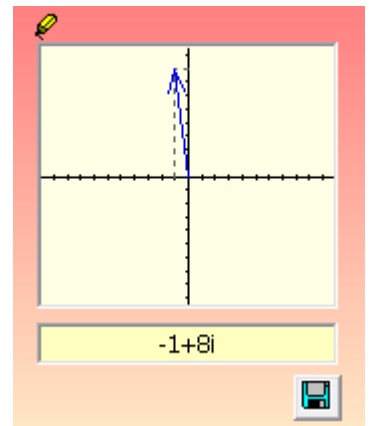
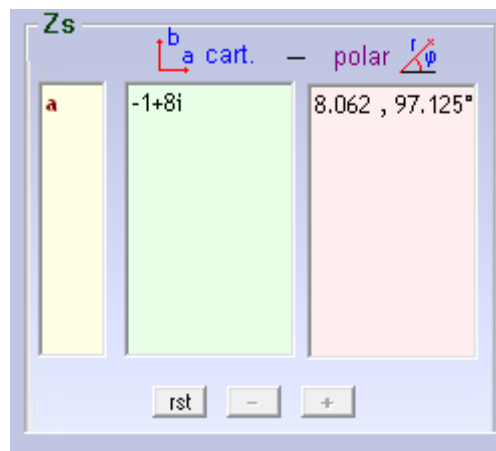
Entry:



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

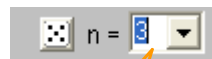
Then click on or **return** in the keyboard.

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:



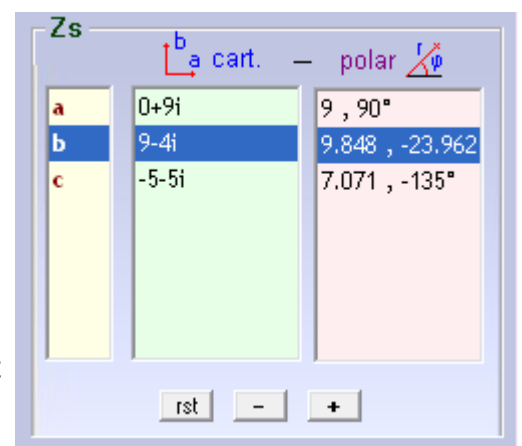
Clicking in the dice button **n** (selected from the list) random complexes are generated and direct added to the available complex numbers list.

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.

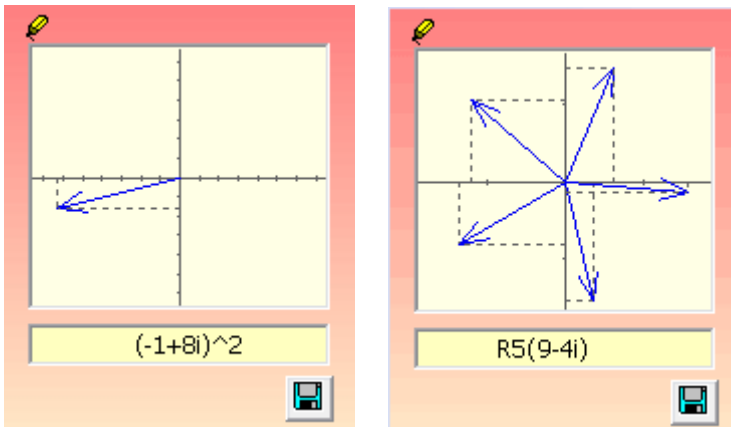
Note: Only the complexes of this list can be used in the next operations.

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 Zⁿ

Z: n =

cartesian: Z = polar:

Zⁿ =

n Root $\sqrt[n]{Z}$

Z: n =

cartesian: Z = polar:

$\sqrt[n]{Z}$ =

<input type="text" value="1.574-0.132i"/>	<input type="text" value="1.58, -4.79°"/>
<input type="text" value="0.612+1.456i"/>	<input type="text" value="1.58, 67.21°"/>
<input type="text" value="-1.196+1.032i"/>	<input type="text" value="1.58, 139.21°"/>
<input type="text" value="-1.351-0.818i"/>	<input type="text" value="1.58, 211.21°"/>

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

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

Binary operations Z1 @ Z2

Z1: cartesian: polar:

Z2: cartesian: polar:

operation	cartesian	polar
Z1 + Z2	4-9i	9.848, -66.037°
Z1 - Z2	14+1i	14.035, 4.085°
Z1 · Z2	-64.999-25.000i	69.641, -158.962°
Z1 ÷ Z2	-0.499+1.3i	1.392, 111.037°

Graphics

2.3. Combined operations

Combined operations a,b,...

a: String of operations: =


cartesian: polar:

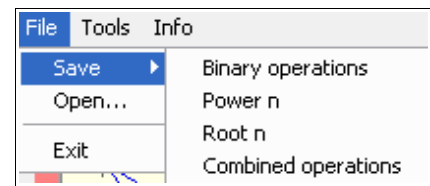
The string of operations can be edited with the keyboard r with the attached buttons


^ : power ' : conjugated (ex: a' = a conjugated), E: 10[^] (ex: 2.7E5 = 2.7 · 10⁵)

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

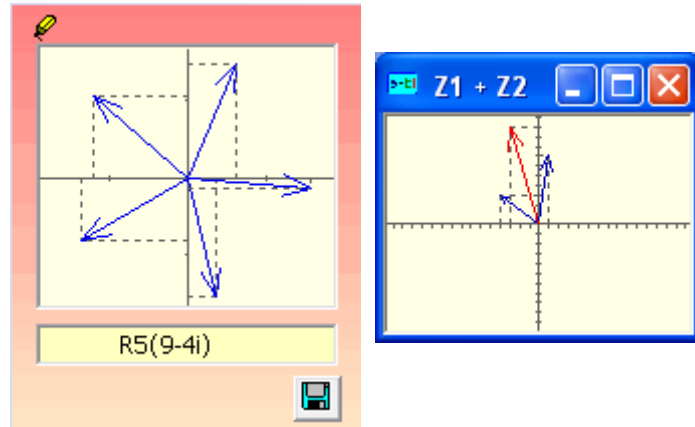
3. Saving and recovering results

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



Graphs 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 of the menu option ...

