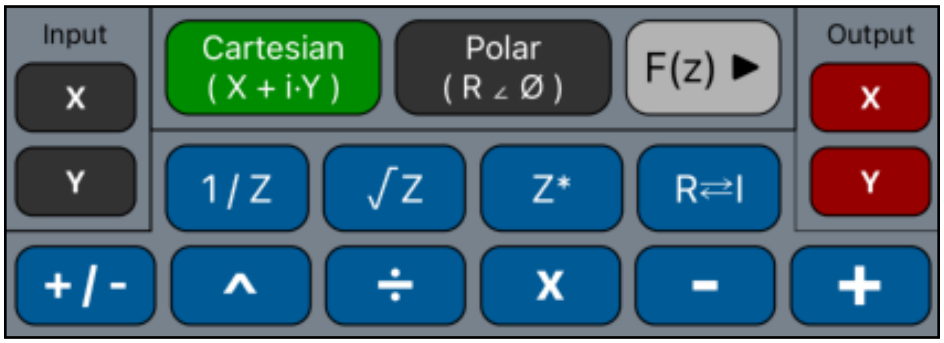
Complex Numbers Menu



This menu implements a Complex stack to perform operations and functions with complex numbers. The complex number coordinates are entered from the calculator using the “Input” buttons, accordingly to the selected coordinate system (Cartesian or Polar).

3D Vector Menu Actions	
[Cartesian] Input: **[X] [Y]** Output: **[X] [Y]**	Set Cartesian coordinates system. Input the calculator’s displayed number in the cartesian ‘X’ or ’Y’ coordinate. Recalls to the calculator the corresponding ‘X’ or ‘Y’ coordinate.
[Polar] Input: **[R] [Θ]** Output: **[R] [Θ]**	Set Polar coordinates system. Input the calculator’s displayed number in: the radial distance ‘R’ to the origin or the polar angle ‘Ø’ (angle with respect to X-axis) coordinate. Recalls to the calculator the corresponding ‘R’ or ‘Ø’ coordinate.
[F(z) ▶]	Shows a menu to apply common mathematical function to Zx.
[1 / Z]	Calculates the reciprocal of Zx.
√ Z	Calculates the square root of Zx.
Z*	Conjugates Zx (change the sign of the imaginary part).
[R⇄I]	Swaps the real and imaginary parts of Zx.
[+ / -]	Change the sign of Zx (change the sign of the real & imaginary part).
[^]	Calculates Z**y** raised to Z**x**. Drop the stack and put the result in Z**x**.

3D Vector Menu Actions	
[÷]	Calculates Z**y** divided by Z**x**. Drop the stack and put the result in Z**x**.
[x]	Calculates Z**y** multiplied by Z**x**. Drop the stack and put the result in Z**x**.
[-]	Calculates Z**y** minus Z**x**. Drop the stack and put the result in Z**x**.
[+]	Calculates Z**y** plus Z**x**. Drop the stack and put the result in Z**x**.

To manipulate the Complex stack, use the same keys for 'Swap', 'Roll Up', 'Roll Down', 'Clear', 'INPUT', 'ENTER', etc available in the calculator's keyboard.
When the Polar coordinates system is selected, the angles are shown in the current angle unit setting.
To better understand how this menu works, follow the next examples carefully.

Example 1: (Arithmetic calculation)
Evaluate the expression: [i·2 • (-8 + i·6)^3] / [(2 + i·3) • (4 + i·5)]

Solution:

Keystrokes	Description
[Cartesian]	Set the Cartesian coordinates.
0 **[X]** 2 **[Y]** **[INPUT]** or **[ENTER]**	Enter the number "0 + i·2" -> **Zx = 0.00 + i·2.00**
8 **[+/-]** **[X]** 6 **[Y]** **[INPUT]** or **[ENTER]**	Enter the complex number "-8 + i·6" -> **Zx = -8.00 + i·6.00**
3 **[X]** 0 **[Y]**	Enter the exponent number "3 + 0·i" -> **Zx = 3.00 + i·0.00**
[^]	Calculate (-8 + 6·i)^3. Result: **Zx** = **352.00 + i·936.00**
[x]	Calculate 2·i•(-8 + 6·i)^3. Result: **Zx = -1,872.00 + i·704.00**
2 **[X]** 3 **[Y]** **[INPUT]** or **[ENTER]**	Enter the complex number "2 + i·3" -> **Zx = 2.00 + i·3.00**
4 **[X]** 5 **[Y]**	Enter the complex number "4 + i·5" -> **Zx = 4.00 + i·5.00**
[x]	Calculates (2-i·3)•(4-i·5). Result: **Zx = -7.00 + i·22.00**
[÷]	Calculate the final result. Result: **Zx = 53.64 + i·68.02**
[X] or **[Y]**	Enters the real or imaginary part of **Zx** in the calculator stack.

Example 2: (Arithmetic calculation)
Calculate the phasor expression: 2 ∠ 65° + 3 ∠ 40° and show the result in cartesian coordinates.

Solution: (DEG angular units)

Keystrokes	Description
[Polar]	Set Polar coordinates system.
2 **[R]** 65 **[Θ]** **[INPUT]** or **[ENTER]**	Enter the 1st phasor -> **Zx = 2.00∠65.00**
3 **[R]** 40 **[Θ]**	Enter the 2nd phasor -> **Zx = 3.00∠40.00**
[+]	Adds the complex numbers phasors. Result: **Zx = 4.89∠49.96**
[R] or **[Θ]**	Enters the magnitude or angle of **Zx** in the calculator stack.
[Cartesian]	Set the Cartesian coordinates. Result: **Zx = 3.14 + I·3.74**
[X] or **[Y]**	Enters the real or imaginary part of **Zx** in the calculator stack.

Example 3: (Parallel impedance)
Calculate total impedance of two parallel loads of 150-i·106.1033 and 100+i·24.5044.

Solution:

Keystrokes	Description
[Cartesian]	Set Polar coordinates system.
150 **[X]** 106.1033 **[+/-]** **[Y]**	Enter the 1st impedance -> **Zx = 150.00 - i·106.1033**
[1 / Z]	Calculates the reciprocal -> **Zx = 0.0044 + i·0.0031**
100 **[X]** 24.5044 **[Y]**	Enter the 2nd impedance -> **Zx = 100.00 + i·24.5044**
[1 / Z]	Calculates the reciprocal -> **Zx = 0.0094 + i·0.0023**
[+]	Adds the reciprocals -> **Zx = 0.0139 + i·0.0008**
[1 / Z]	Total impedance -> **Zx = 71.8042 - i·4.3021**