

2022-11-05

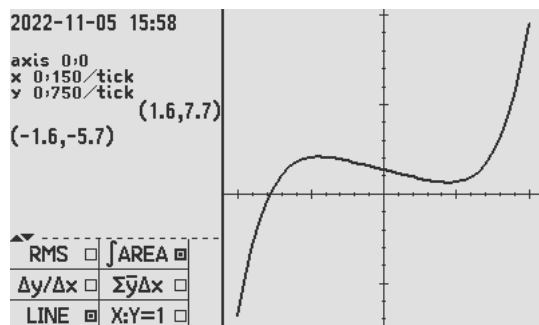
Complex solver and Draw of arbitrary equations on C43

This application uses the standard WP43 solver and draw.

Let us purposely define an equation in EQN which has complex and real roots,
 $X^5 - X + 1 = 0$

[EQN] [NEW] x [F2] g[5] g[-] x g[+] g[1] ENTER [Solver]

Now, define x by pressing [x] then
define the lower limit 1.5 [CHS] [x] then
define the higher limit 1.5 [x]
[DRAW]



The lower left point on the Cartesian plane is given in the left parenthesis (-1.6, -5.7) and the upper right point is given by the other set of parenthesis, (1.6, 7.7).

Now it is clear to see that there is only 1 real root, and looking at the grading marks on the axis which are 0.15 apart, and the left extreme of $X=-1.6$, the root seems to be between -1.5 and -0.8. But let's say I want the complex root only.

Press EXIT to leave the graph.

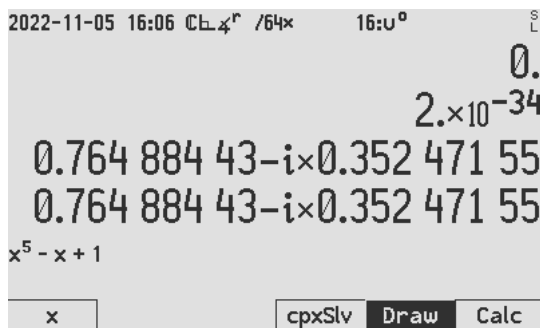
So start the solver by providing initial estimates. Start from a complex number if you want an complex answer.

Press fast triple f to get to HOME, then type g[F4] to get I, then press EXIT. Or use the conventional 0 ENTER 1 COMPLEX to get i into X. Press [x] to set the lower limit.



Type 2 * [x] to get a larger complex number in X, and press define the upper limit.

Now type [cpxSlv] to launch the complex solver.

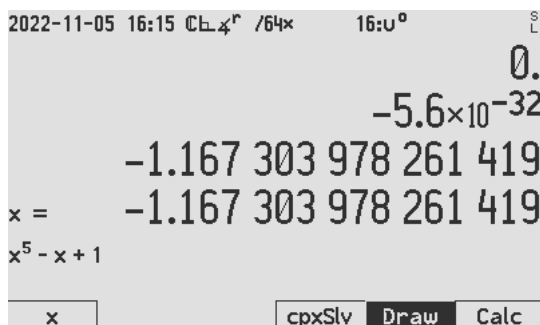


The solver exits with the error margin in Z, and the last two tries for roots in Y and X.

If we want to find the real root, we can use the [cpxSlv] or the standard solver – let's do both:

Firstly determine from the graph or otherwise that the root seems to be between -1.5 and -0.8. now enter these extremes on either method:

Standard HP way: 1.5 [CHS] [x] 0.8 [CHS] [x] [x]



Or using the new WP43 way: 1.5 [CHS] [x] 0.8 [CHS] [x] [cpxSlv]

