1.12 Complex numbers

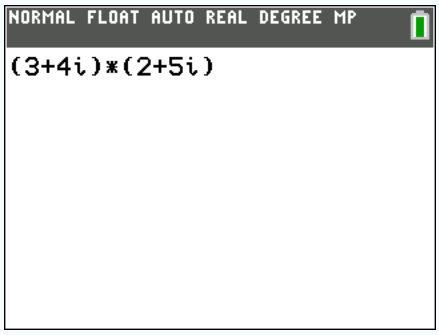
To write the imaginary unit i, press 2nd , . .

1.12.1 Operations on complex numbers

Consider the complex numbers $3+4i$ and $2+5i$.

Suppose you want to add them. For this, just add them as you would add real numbers. The result should be $5+9i$.

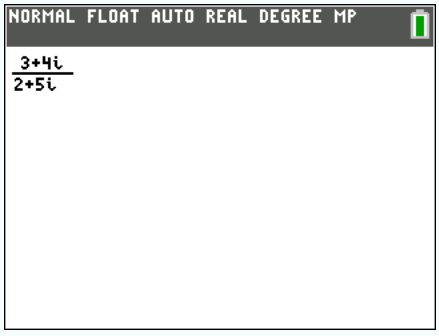
Suppose you want to multiply them. For this, put each of them in brackets and multiply each bracket:



* is not mandatory

Press entry solve enter . The result should be $-14+23i$.

Suppose you have to divide them. For this, press A-lock alpha , stat plot f1 y= and n/d to display a fraction, and put the numbers in each part of the fraction:



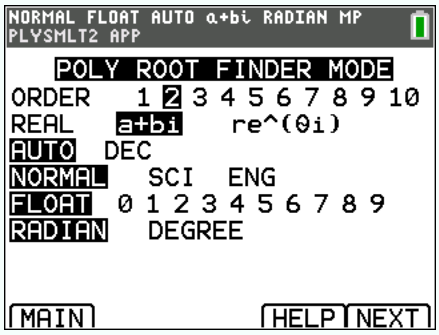
Press entry solve enter . The result should be about $0.897-0.241i$, or $\frac{26}{29}-\frac{7}{29}i$. If you want to switch between decimal and fraction writing, press A-lock alpha , stat plot f1 y= and ▶F◀▶D.

1.12.2 Solve polynomial equations (complex solutions)

Suppose you have to solve the equation $x^2 + x + 1 = 0$.

> The right hand side must be 0

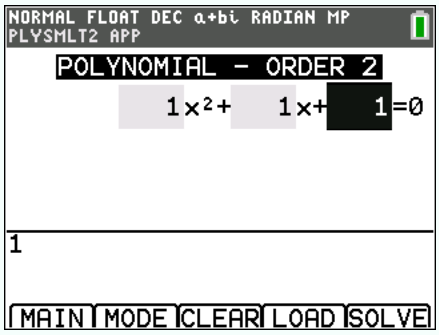
① Press angle B apps , PlySmlt2, POLYNOMIAL ROOT FINDER, and fill it as follows:



The order is the biggest power of x. Be sure to select a+bi!

Press NEXT with the table f5 graph button.

② Fill the equation as follows:



Press SOLVE with the table f5 graph button. The results should be $x_1 = -\frac{1}{2} + \frac{\sqrt{3}}{2}i$ and $x_2 = -\frac{1}{2} - \frac{\sqrt{3}}{2}i$, or $x_1 = -0.5 + 0.866i$ and $x_2 = 0.5 + 0.866i$ (rounded).

To change from one display to the other, press ◄► with the table f5 graph button.