

Day 13

Eisenstein

The only Gaussian integers with $N=1$ are $1, -1, i, -i$.

The only Gaussian integers with $N=121$ are $11+0i, -11+0i, 0+11i, 0-11i$

121 is not prime because $121 = 11^2$

All possible factorizations of $11i$:

$$\begin{array}{cccc} 11i = 11 \cdot i & 11i = 11i \cdot 1 & 11i = (-11)(-i) & 11i = (-11i)(-1) \\ N=121 \quad N=1 & N=121 \quad N=1 & N=121 \quad N=1 & N=121 \quad N=1 \end{array}$$

$$11i = \left(\begin{array}{c} \text{no possible} \\ \text{Gaussian int} \\ N=11 \end{array} \right) \left(\begin{array}{c} \\ N=11 \end{array} \right)$$

So $11i$ is a Gaussian prime.