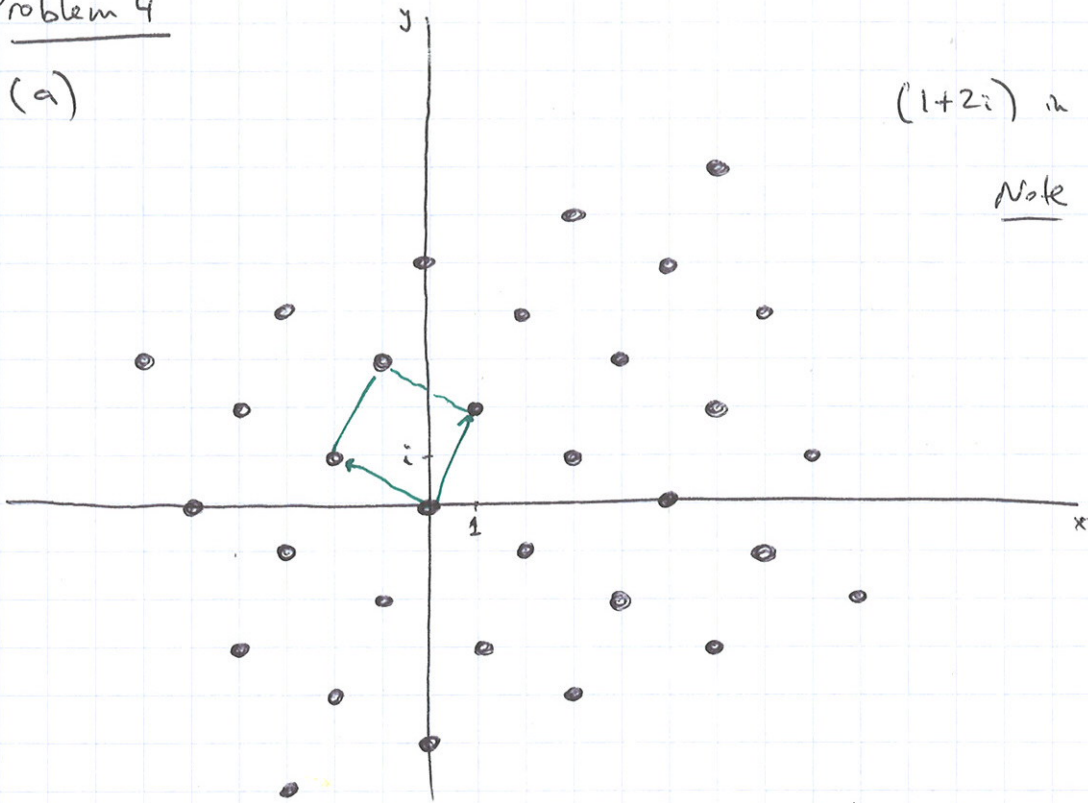


Problem 4

(a)



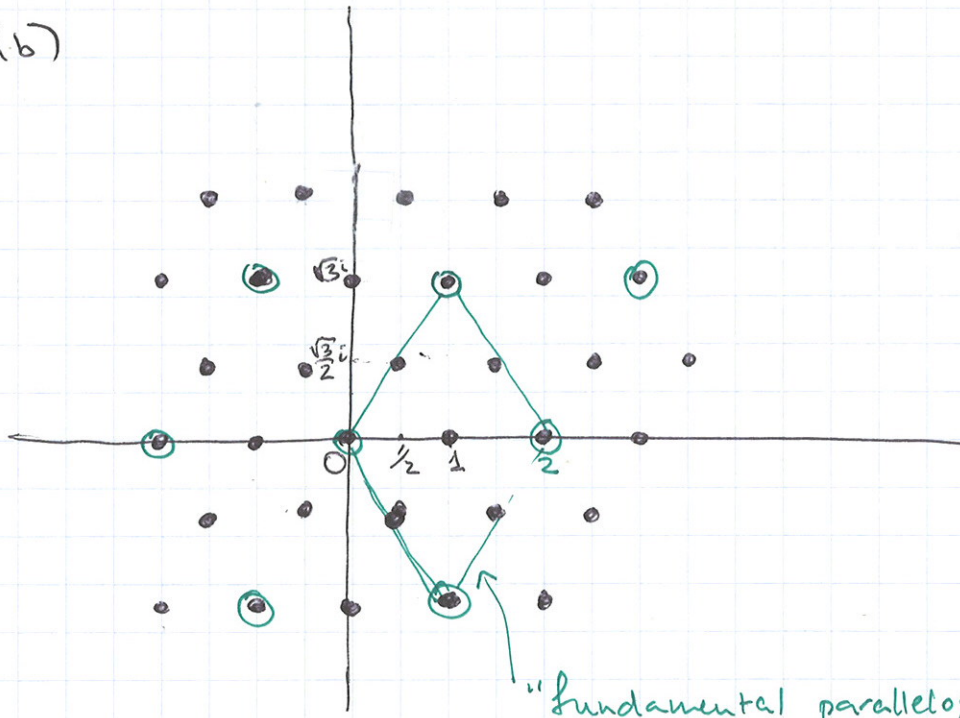
$(1+2i)$  in  $\mathbb{Z}(i)$

Note There are 4 integral points in the "fundamental parallelogram"

(green square in the picture) and the 4 corners count as 1, so

$$\left| \frac{\mathbb{Z}(i)}{(1+2i)} \right| = 5 = N(1+2i).$$

(b)



• - elements of  $\mathbb{Z}\left[\frac{1+\sqrt{3}}{2}\right]$

⊙ - elements of the ideal  $(2)$ .

Fundam. parallelogram has 1 ring ~~out~~ element inside, 1 for all the vertices, and two for two pairs of inequivalent points on the edges.

$$\text{We set } \left| \frac{\mathbb{Z}\left[\frac{1+\sqrt{3}}{2}\right]}{(2)} \right| = 4 = N(2).$$