Algebra I – autumn 2024 – Homework 11

1. Prove that

$$I = \{a + b\mathrm{i}\sqrt{13}; a, b \in \mathbb{Z}, a + 3b \text{ is divisible by } 22\}$$

   is an ideal of $\mathbb{Z}[\mathrm{i}\sqrt{13}] = \{a + b\mathrm{i}\sqrt{13} \in \mathbb{C}; a, b \in \mathbb{Z}\}$.

2. Decide whether I is a prime ideal of $\mathbb{Z}[\mathrm{i}\sqrt{13}]$.

3. Decide whether I is a maximal ideal of $\mathbb{Z}[\mathrm{i}\sqrt{13}]$.