

### Appendix 3: Pictures of prime numbers for complex non-UFD

The pictures show the quadratic character and a picture of **prime numbers** and **units** for some complex quadratic fields whose domain of integers is not a unique-factorization domain, namely of class numbers,  $h$ , as indicated

the fields of discriminant congruent 0 modulo 4:

$$h = 2: \mathbb{Q}(\sqrt{-5}), \mathbb{Q}(\sqrt{-6}), \mathbb{Q}(\sqrt{-10}), \mathbb{Q}(\sqrt{-13}), \quad h = 4: \mathbb{Q}(\sqrt{-14}), \mathbb{Q}(\sqrt{-17}), \mathbb{Q}(\sqrt{-21}), \\ h = 2: \mathbb{Q}(\sqrt{-22}), \quad h = 6: \mathbb{Q}(\sqrt{-26}), \mathbb{Q}(\sqrt{-29})$$

and the fields of discriminant congruent 1 modulo 4:

$$h = 2: \mathbb{Q}(\sqrt{-15}), \quad h = 3: \mathbb{Q}(\sqrt{-23}), \mathbb{Q}(\sqrt{-31}), \quad h = 2: \mathbb{Q}(\sqrt{-35}), \quad h = 4: \mathbb{Q}(\sqrt{-39}).$$

The pictures display the prime numbers, which generate the principal prime ideals, but not those irreducible numbers which are not prime. Moreover, the non-principal prime ideals are not displayed (see, however, appendices 5 and 7).





