

## SOLUTIONS TO EXERCISES

The exercises below are taken from [Har77, Chapter IV].

*Exercise 1.1.* Let  $X$  be a curve, and let  $P \in X$  be a point. Then there exists a nonconstant rational function  $f \in K(X)$ , which is regular everywhere except at  $P$ .

*Solution.* We need to show that  $l(nP) > 1$  for some non-zero  $n \in \mathbb{N}$ . Indeed, Riemann–Roch implies that this holds for all large enough  $n \in \mathbb{N}$ , as explained in [Har77, Remark 1.3.2]. ■

### REFERENCES

- [Har77] Robin Hartshorne. *Algebraic geometry*. Graduate Texts in Mathematics, No. 52. Springer-Verlag, New York-Heidelberg, 1977, pp. xvi+496. ISBN: 0-387-90244-9.