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Algebra II – Problem Sheet 14

Exercise 1

Show that any Dedekind domain with only finitely many prime ideals is a principal ideal domain.

Exercise 2

Let R be a Dedekind domain. Show that:

a) If $I \trianglelefteq R$ is a nonzero ideal of R then every ideal in R/I is a principal ideal.

b) Any ideal of R can be generated by at most 2 elements.

Exercise 3

Let K be a field with $\mathrm{char}(K) \neq 2$ and $\lambda \in K \setminus \{0, 1\}$. Show that

$$K[X, Y]/(Y^2 - X(X-1)(X-\lambda))$$

is a Dedekind domain.