Suggested exercises, Lecture 1

Galois theory

The following exercises are not necessarily easy. However trying to solve them will help you in understanding what PID's and UFD's are.

1. Show that a PID is UFD.

2. Let R be a domain. Show that $R[X]$ is a PID if and only if R is a field.

3. Show that $\mathbf{Z}[X]$ is not a PID.

4. Show that $\mathbf{Z}[\sqrt{5}]$ is not a UFD.

5. Show that $\mathbf{Q}[\sqrt{5}]$ is a field.