NAP 2019, MODULE II, CLASS #1, MAY 22, 2019

Michel Waldschmidt

1. Answer to questions:
Short history of Galois Theory
Irrational numbers. Irrationality of $\sqrt{2}$: proof using a rectangle of sides $1 + \sqrt{2}$ and 1.
Algebraic numbers, examples.
Transcendental numbers: Liouville $\sum_{n\geq 1} 2^{-n!}$, Hermite e, Lindemann π, squaring the circle.

2.Garling p. 40 − 41
Recall the constructions $\mathbb{N} \subset \mathbb{Z} \subset \mathbb{Q} \subset \mathbb{R} \subset \mathbb{C}$.
Fields, extensions; subfields.
Examples: $\mathbb{Q}$, $\mathbb{R}$, $\mathbb{C}$, $K(X)$, $\mathbb{Q}(\sqrt{2})$, $\mathbb{Q}(i)$, $\mathbb{Q}(\sqrt[3]{2})$, $\mathbb{Q}(i, \sqrt{2})$.
Fact: when $L : K$ is an extension, then L is a K–vector space.
Degree of a field extension $[L : K]$.
Exercise: give the degree of the extension $L : K$ for L and K in the previous list.

Schedule:
class 1, Wednesday, May 22, 4:30 − 6:00
class 2, Thursday, May 23, 6:00 − 7:30
class 3, Friday, May 24, 4:30 − 6:00
class 4, Monday, May 27, 6:00 − 7:30
class 5, Wednesday, May 29, 4:30 − 6:00
class 6, Thursday, May 30, 6:00 − 7:30
class 7, Friday, May 31, 4:30 − 6:00
class 8, Monday, June 3, 4:30 − 6:00

Problem Set # 1: Exercises of Garling's notes, starting with 4.1 p. 42.
Due Tuesday, May 28, 10 pm Kathmandu Time