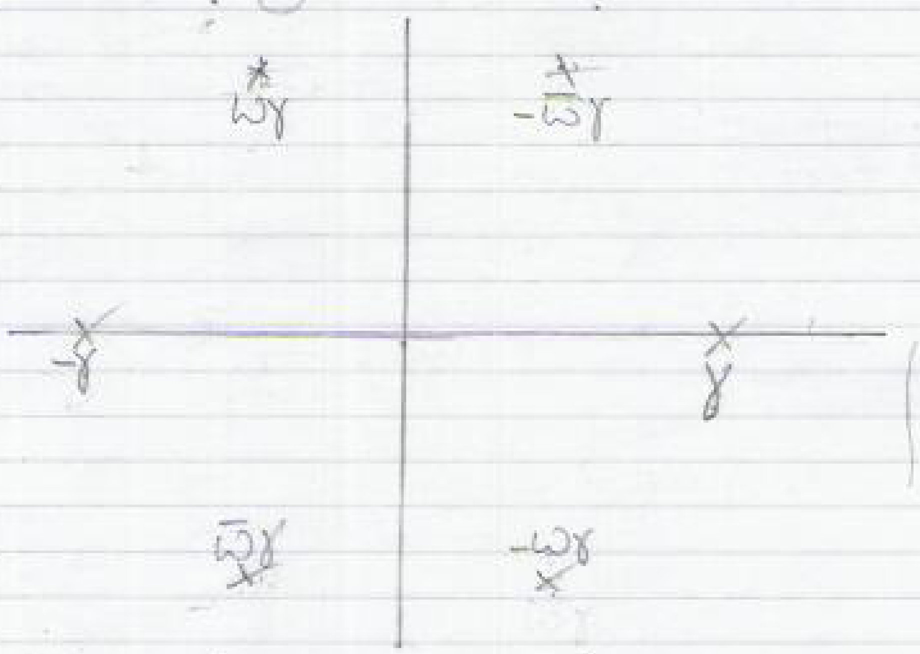
and each element of $\Gamma(L:Q)$ is completely determined by its effect on γ and ω.

vi) $L = (Q(\gamma))(\omega)$. The minimum polynomial of ω over $Q(\gamma)$ is t^2+t+1.

The other zero of this polynomial is $\bar{\omega}$. By Prop 10.2 there is an $Q(\gamma)$ automorphism τ such that

$$\tau(\gamma) = \gamma$$
$$\tau(\omega) = \bar{\omega} \quad (\text{and } \tau^{\circ}(\omega) = \tau^2(\omega) = \omega)$$

The minimum Polynomial of γ over Q is t^6-6. The zeros of this polynomial are shown on the Argand diagram below.



They are $\gamma, -\bar{\omega}\gamma, \omega\gamma, -\gamma, \bar{\omega}\gamma, -\omega\gamma$.

$$-\bar{\omega}\gamma = \sigma^5(\gamma)$$
$$\omega\gamma = \sigma^4(\gamma)$$
$$-\gamma = \sigma^3(\gamma)$$
$$\bar{\omega}\gamma = \sigma^2(\gamma)$$
$$-\omega\gamma = \sigma(\gamma)$$

By Prop. 10.2 there are Q automorphisms σ of L such that

$$\sigma^i(\gamma) = (-\omega)^i\gamma \quad (\text{or } (-\bar{\omega})^i\gamma)$$

where $-\omega = e^{-\pi i/3}$