Notations.

(i) $\mathbf{Q}$: the field of rational numbers; $\bar{\mathbf{Q}}$: its algebraic closure.
$\mathbf{R}$: the field of real numbers; $\mathbf{C}$: the field of complex numbers;
Re , Im : the real and the imaginary parts.

(ii) $\mathbf{Z}$: the ring of rational integers.
$\mathbf{Z}^{(p)} = \bigcup_{n=0}^{\infty} \frac{1}{p^n}\mathbf{Z}$, where p is a prime number.

(iii) $k_{\mathfrak{p}}$: a $\mathfrak{p}$-adic number field; $O_{\mathfrak{p}}$: the ring of integers of $k_{\mathfrak{p}}$;
$\mathfrak{p}$: the maximal ideal of $O_{\mathfrak{p}}$; $\mathcal{U}_{\mathfrak{p}}$: the multiplicative group $O_{\mathfrak{p}} - \mathfrak{p}$;
$q = N\mathfrak{p} = (O_{\mathfrak{p}} : \mathfrak{p})$; $\mathrm{ord}_{\mathfrak{p}}$: the normalized additive valuation of $k_{\mathfrak{p}}$.
$\mathbf{Q}_p$: the p-adic number field; $\mathbf{Z}_p$: the ring of integers of $\mathbf{Q}_p$.

(iv) $G_{\mathbf{R}} = PSL_2(\mathbf{R})$, $G_{\mathfrak{p}} = PSL_2(k_{\mathfrak{p}})$; $PSL_2 = SL_2/\pm 1$, $PL_2 = GL_2/\text{center}$;
$G = G_{\mathbf{R}} \times G_{\mathfrak{p}}$. If $S \subset G$ (subset), $S_{\mathbf{R}}, S_{\mathfrak{p}}$ are set-theoretical projections of S to $G_{\mathbf{R}}, G_{\mathfrak{p}}$, respectively.

(v) $\mathfrak{H}$: the complex upper half plane, $G_{\mathbf{R}} = \mathrm{Aut}(\mathfrak{H})$ by Chapter 1, §3.

(vi) If $K \supset k$ are fields, then $\mathrm{Aut}\,K$, $\mathrm{Aut}_k K$ are the automorphism groups of K, or the automorphism groups of K over k, respectively. If $\sigma \in \mathrm{Aut}\,K$, $\sigma|_k$ is its restriction to k. $K^\times$ is the multiplicative group $K - \{0\}$.

(vii) If L is a $G_{\mathfrak{p}}$-field over $\mathbf{C}$, then Σ is the set of all non-trivial non-equivalent discrete valuations of L over $\mathbf{C}$, considered as a complex manifold (see Chapter 2).

(viii) If Γ is a group, then 1 or $I \in \Gamma$ denotes the identity element of Γ; if $\gamma \in \Gamma$, then $\mathrm{Int}(\gamma)$ is the inner automorphism $x \mapsto \gamma^{-1}x\gamma$ of Γ; $\{\gamma\}_\Gamma$ is the Γ-conjugacy class containing γ. If $\Gamma^0 \subset \Gamma$, then $\mathcal{H}(\Gamma, \Gamma^0)$ is the Hecke ring with respect to the left Γ^0-coset decomposition of Γ (if it is defined).

(ix) Finally, if S is a set, $|S|$ or $\#(S)$ denotes its cardinality.