Abbreviated Dictionary of Groups

Group	Order	Presentation	Abelian?	Simple?	Notes
$\mathbb{Z}$	∞	$\langle a \rangle$	yes	$n\mathbb{Z} \lhd$	Integers
$\mathbb{Z}/n$	n	$\langle a \vert a^n = 1 \rangle$ $\langle 1 \vert n(1) = 0 \rangle$	yes	$\langle [m] \vert m \vert n \rangle \lhd$	Integers mod n
S_n	$n!$		Not if $n \geq 3$ $(123)(12) \neq (12)(123)$	$A_n \lhd S_n$	$S_n = Bij(X_n)$ Permutations
A_n	$(1/2)n!$		Not if $n \geq 3$	For all $n \geq 5$	Even Permutations
K_4	4	$\langle a, b \vert a^2 = b^2 = 1, ab = ba \rangle$	yes	$\{1, a\} \lhd K_4$	$K_4 = D_2$
D_3	6	$\langle a, b \vert a^3 = 1 = b^2, aba = b \rangle$	$ab \neq ba$	$\langle a \rangle \lhd D_3$	Symmetries of the triangle
D_n	$2n$	$\langle a, b \vert a^n = 1 = b^2, aba = b \rangle$	$ab \neq ba$	$\langle a \rangle \lhd D_n$	Symmetries of the n-gon
Q_8	8	$\{\pm 1 \pm i \pm j \pm k \vert i^2 = j^2 = k^2 = -1,$ $ij = k, jk = i, ki = j\}$	$ij \neq ji$	Every subgroup is normal	Quaternions
$\mathbb{C}^+, \mathbb{R}^+, \mathbb{Q}^+$	∞	(un)countably generated	yes	no	
$\mathbb{C}^*, \mathbb{R}^*, \mathbb{Q}^*$	∞	(un)countably generated	yes	Favorite: $S^1 \lhd \mathbb{C}^*$	
$Inn(G)$	$\leq G$		Depends on G	Depends on G	Inner Automorphisms
$Aut(G)$	$\leq \vert G \vert !$		Usually not.	Usually not: $Inn(G) \lhd Aut(G)$	Automorphisms