Exercise 1. Let G be a group and let $H \leq G$. Prove that if $xHx^{-1} \subseteq H$ for all $x \in G$, then $H \subseteq xHx^{-1}$ for all $x \in G$.

Exercise 2. Prove that $\mathrm{SL}_2(\mathbb{R}) \triangleleft \mathrm{GL}_2(\mathbb{R})$. Is the Borel subgroup B normal in $\mathrm{GL}_2(\mathbb{R})$?

Exercise 3. Prove that $\langle r \rangle \triangleleft D_n$.