Let G be a group with $X \subseteq G$, and let A be the normal subgroup generated by X, i.e.:

$$A = \bigcap \{N \triangleleft G : X \subseteq N\}.$$

Let $Y = \{gxg^{-1} | x \in X, \ g \in G\}$. Show that $A = \langle Y \rangle$.