

SUBGROUPS GENERATED BY SUBSETS OF A GROUP

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PROPOSITION

If \mathcal{A} is any collection of subgroups of a group G , then $\cap_{A \in \mathcal{A}} A$ is also a subgroup of G .

DEFINITION

Suppose that G is a group and that $A \subseteq G$. Then we define the the subgroup generated by A to be $\langle A \rangle = \cap_{A \subseteq H \leq G} H$

DEFINITION

Suppose that G is a group and that $A \subseteq G$. We define

$$\bar{A} = \{a_1 \cdots a_k \mid k \geq 0; a_i \in A \text{ or } a_i^{-1} \in A\}.$$

PROPOSITION

Suppose that G is a group and that $A \subseteq G$. Then $\langle A \rangle = \bar{A}$.