

1. [2 points] Give generators for a noncyclic subgroup of order 4 in D_8 . No explanation needed.

$$\langle s, r^2 \rangle = \{1, s, r^2, sr^2\}$$

2. [3 points] Let G be a group and $A \subseteq B \subseteq G$. Show that $\langle A \rangle \leq \langle B \rangle$.

Note that since $\langle A \rangle$ and $\langle B \rangle$ are both already subgroups of G , we just need to show $\langle A \rangle \subseteq \langle B \rangle$.

Since $A \subseteq B \subseteq \langle B \rangle$ by definition.

Since $\langle A \rangle$ is the intersection of subgroups containing A , we can conclude

$\langle A \rangle \subseteq \langle B \rangle$, as desired.