1. Complete the definition: Two elements $x$ and $y$ of a group $G$ are called conjugate if . . .
Solution: . . . there exists a $g \in G$ such that $gxg^{-1} = y$.

2. Let $G$ be a group of permutations of a set $S$. Suppose $a \in S$. Define the stabilizer of $a$ in $G$.
Solution: The stabilizer of $a$ in $G$ is the set $\{g \in G : g(a) = a\}$.

3. The group $S_3$ is a group of permutations of the set $\{1, 2, 3\}$. Find $\text{stab}_{S_3}(1)$.
Solution: The only elements in $S_3$ that do not move 1 are the identity and the transposition $(2\ 3)$. So

$$\text{stab}_{S_3}(1) = \{e, (2\ 3)\}.$$