1. Let $G_1$ and $G_2$ be groups. Define an isomorphism from $G_1$ to $G_2$.

Solution: An isomorphism from $G_1$ to $G_2$ is a mapping $\phi$ from $G_1$ to $G_2$ that is one-to-one, onto, and operation-preserving, in the sense that

$$\phi(gh) = \phi(g)\phi(h)$$

for all $g$ and $h$ in $G_1$.

2. State Cayley’s Theorem.

Solution: Every group is isomorphic to a group of permutations.