

3. Prove or disprove: Let G and H be groups. If $B \leq G$ and $C \leq H$, then $B \times C \leq G \times H$.

4. Prove or disprove: If A is a subgroup of $G \times H$ (where G and H are groups, of course), then A must be of the form $A = B \times C$, where $B \leq G$ and $C \leq H$.