▶ **Problem 4.3-35** Let a, b, and c be integers each relatively prime to another integer n. Prove that the product abc is relatively prime to n.

Proof. If abc and n are not relatively prime, then there exists a prime p such that $p|abc$ and $p|n$. By Corollary 4.3.8, $p|a$ or $p|b|$ or $p|c$. In the first case, $p|a$ and $p|n$ contradict $\gcd(a, n) = 1$. The other two cases are similar. □