▶ **Problem 4.2-20** If $k \in \mathbf{N}$, prove that $\gcd(3k+2, 5k+3) = 1$.

Proof. Let x be the greatest common divisor of $3k+2$ and $5k+3$ for any $k \in \mathbf{N}$. Then, $x|3k+2$ and $x|5k+3$. Clearly, $x|5(3k+2)$ and $x|3(5k+3)$, and it further implies $x|[5(3k+2) - 3(5k+3)]$. Thus $x|1$. From the fact that 1 can be divides by an integer x, we have $x = 1$, and so $\gcd(3k+2, 5k+3) = 1$. □