(1) Let a, b, c be natural numbers. Let (a, b, c) be the largest natural number that divides a, b and c.
   (a) Prove that $gcd(a, b, c) = gcd(gcd(a, b), c)$.
   (b) Prove that the equation $ax + by + cz = gcd(a, b, c)$ has an integer solution.
(2) Find $6^{100}(\mod 14)$.
   Note: Note that $gcd(6, 14) \neq 1$!
(3) Prove that if $m \equiv 1(mod\ \phi(n))$ and $(a, n) = 1$ then $a^m \equiv a(mod\ n)$, where ϕ is Euler's function.