(1) Let $p = 11$. For every $a = 1, \dots 10$ find a natural number b such that $1 \leqslant b \leqslant 10$ and $a \cdot b \equiv 1 (\mod 11)$.
(2) Give an example of natural numbers a, x, y, m such that $a \nmid m$, $ax \equiv ay (\mod m)$ but $x \not\equiv y (\mod m)$
(3) Show that $lcm(a, b) = \frac{ab}{(a,b)}$ for any natural numbers a, b. Here $lcm(a, b)$ is the least common multiple of a and b.
(4) To what number between 0 and 6 inclusive is the product $11 \cdot 18 \cdot 2322 \cdot 13 \cdot 19$ congruent modulo 7?
(5) To what number between 0 and 4 inclusive is the sum $1 + 2 + 2^2 + 2^3 + \dots + 2^{219}$ congruent modulo 5?
(6) Let $p > 5$ be a prime number. Prove that $6[(p - 4)!] \equiv 1 (\mod p)$.