(1) Using the method from class write a table of all prime numbers \( \leq 100 \). Explain why you only need to cross out the numbers divisible by 2, 3, 5 and 7.

(2) Let \( p_1, p_2 \) be distinct primes. Using the Fundamental Theorem of Arithmetic prove that a natural number \( n \) is divisible by \( p_1 p_2 \) if and only if \( n \) is divisible by \( p_1 \) and \( n \) is divisible by \( p_2 \).

(3) (a) Find all possible values of \( 2^k \pmod{6} \).
    (b) Find all possible values of \( k^2 \pmod{6} \)

(4) Find the rule for checking when an integer is divisible by 13 similar to the rule for checking divisibility by 9 done in class.

(5) Prove that if \( m > 1 \) is not prime then there exist integers \( a, b, c \) such that \( c \not\equiv 0 \pmod{m} \), \( ac \equiv bc \pmod{m} \) but \( a \not\equiv b \pmod{m} \).