

- (1) Using the method from class write a table of all prime numbers ≤ 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 $a \not\equiv b \pmod{m}$.