

MATH 312: ASSIGNMENT 6
DUE DATE: OCTOBER 26, 2012

- 1) Find a reduced residue system modulo 10 and 17.
- 2) Use Euler's theorem to show to find the last digit of the decimal expansion of $7^{999,999}$.
- 3) Solve $3x \equiv 5 \pmod{16}$ using Euler's theorem.
- 4) Find all positive integers n such that $\phi(n) = 6$. Prove that your list of solutions is complete.
- 5) Find the least positive integer n such that $\phi(n) \geq 100$.
- 6) A multiplicative function f is called strongly multiplicative if and only if $f(p^k) = f(p)$ for every prime p and every positive integer k . Show that $f(n) = \phi(n)/n$ is a strongly multiplicative function.
- 7) show that the equation $\sigma(n) = k$ has at most a finite number of solutions when k is a positive integer.
- 8) Find a factor of $2^{46,189} - 1$.
- 9) Find a complete set of incongruent primitive roots of 19.
- 10) Find the number of incongruent roots modulo 11 of $x^4 + x^2 + 1$.