116 - Number Theory
Spring 2007

Homework 8

Name: _____
Instructor: Travis Kelm

Section 7.3 - Perfect Numbers and Mersenne Primes

1. **From Class:** Show that every Mersenne prime greater than three ends in either a 1 or a 7.

Section 9.1 - Orders and Primitive Roots

2. **Exercise 2:** Determine each of the following:
   (a) $\text{ord}_{11}(3)$
   (b) $\text{ord}_{17}(2)$
   (c) $\text{ord}_{21}(10)$
   (d) $\text{ord}_{25}(9)$
3. **Exercise 4:**
4. **Exercise 6:**
5. **Exercise 8:**
6. **Exercise 14:**
7. **Exercise 16:** Show that if r is a primitive root modulo m then the modular inverse of r is also a primitive root modulo m.
8. **Primitive Existence:** Among the first 16 integers, which have primitive roots and which do not?