

Homework 2 - Math 580, Frank Thorne (thornef@mailbox.sc.edu)

Due Thursday, September 11

- (1) Dudley, p. 19: 2, 6, 13, 15; p. 26, 1, 2, 5, 7, 10; p. 33, 1, 3, 4, 8.
- (2) Let S be the set of integers $3n + 1$, for $n \geq 0$. Recall that n is prime in S if it has no divisors other than 1 and itself which are in S .
Find the first ten primes in S , and determine whether unique factorization holds in S .
- (3) Repeat the above problem, where S is now the set of integers $5n + 1$.
- (4) Repeat the above problem, where S is now the set of integers coprime to 7.

Bonus problems:

- (1) Generalizing the examples of S above, conjecture one or more theorems which you believe to be true, which describe whether or not these types of sets have unique factorization.
Prove as much as you can. Your proofs might depend on statements which you suspect are true but don't know how to prove. If so, say so.