Due Sept 28

Exercises 1.4 Revised

2. Construct the addition and multiplication table for $\mathbb{Z}_n$ when n is 4 and when n is 5.

3. Find the following inverses if they exist:

(i) the inverse of 31 modulo 11
(ii) the inverse of 237 modulo 91
(iii) the inverse of 18 modulo 19.

5 & 6. Show that no integer of the form $8k+7$ can be the sum of three squares.

7. Let p be a prime number. Show that

$$(p-1)! \equiv -1 \pmod{p}.$$

8. Give a new proof of the Fundamental Theorem of Arithmetic that starts as follows:

Proof. Let S be the set of integers each > 1 that do NOT have a unique factorization into primes. . . . .