

Homework Assignment #9: Mathematical Fundamentals

Your Name: _____

1. (4%) Evaluate the following:

- (1) $7503 \pmod{81}$
- (2) $(-7503) \pmod{81}$

2. (10%) Z_{11} is a field with modulo addition and multiplication (mod 11).

(1) Please fill in the following multiplication table of Z_{11} .

\times	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

(2) Compute the multiplicative inverse 2^{-1} , 3^{-1} , and 10^{-1} in Z_{11} .

(3) Evaluate $((2 - 4) \times 4)/2$ in Z_{11}

3. (6%) The Galois field $GF(2^3)$ can be constructed as $Z_2[x]/(x^3+x+1)$.

(1) List all elements in $GF(2^3)$

(2) Compute $(x^2 + x) \times (x^2 + x + 1)$