CM3110 Security

Practice Problems on Modular Arithmetic

Practice Problems

Problem 1.5

1. $15 \times 29 \bmod 13$
2. $2 \times 29 \bmod 13$
3. $2 \times 3 \bmod 13$
4. $-11 \times 3 \bmod 13$

Practice Problems

Problem 1.6

1. 1 / 5 mod 13

   x = 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
   5 * x mod 13 = 1

2. 1 / 5 mod 7
3. 3 x 2 / 5 mod 7

Practice Problems

Problem 1.7

0. Addition table for ring Z_4
1. Multiplication table for Z_4
2. Addition and multiplication tables for Z_5
3. Addition and multiplication tables for Z6
4. Elements in Z_4, Z6 with no multiplicative inverse. Which are they? What about Z_5?

Practice Problems

Problem 1.8

Multiplicative inverses of 5 in Z_{11}, Z_{12}, Z_{13}

Practice Problems

Problem 1.9

1. $x = 3^2 \bmod 13$
2. $x = 7^2 \bmod 13$
3. $x = 3^{10} \bmod 13$
4. $x = 7^{100} \bmod 13$