FIT2093: Tutorial 6

Introduction to Number Theory

Problems

1. Write the following composites numbers as a multiplication of their prime factors.
    a. 12
    b. 78
    c. 99
    d. 128
2. Check whether the following pairs of numbers are relative primes.
    a. 12 and 48
    b. 5 and 125
    c. 6 and 44
    d. 8 and 51
    e. 7 and 64
3. What is the greatest common divisor of the following set of numbers?
    a. 12, 24 and 18
    b. 5, 125 and 60
    c. 49 and 175
4. Find the congruent class of each number in modulo 8
    a. 28
    b. 33
    c. 5
    d. 12
    e. 6
5. Complete the following modular arithmetic operations and determine the result:
    a. (12+8) mod 6 = ?
    b. (2x12) mod 6 = ?
    c. (20+125) mod 5 = ?

d. (20-35) mod 5 = ?
e. 10^4 mod 3 = ?

6. What is the value of Euler Totient $\varphi(n)$ of the following:
   a. 3
   b. 7x5
   c. 3X11
7. Let X to be the set of all the possible relative primes of 15 that is less then 15. Note, you can write 15 as a multiplication of 3 * 5. List the members of X.
8. Check whether the following pair of numbers in a given modulo is a multiplicative inverse.
   a. Numbers 3 and 7 in modulo 10.
   b. Numbers 7 and 11 in modulo 13.
   c. Numbers 3 and 4 in modulo 11.