CS 235
Spring 2010

Assignment 7 - Last Assignment

Date Due: Thursday, April 29 at 5:00

Reading: Chapter 12, page 271-274, chapter 13, pages 285-292, and chapter 15, pages 307-318

Problems:

1. Page 195, problem 79.

2. Find a positive integer a which is less than 140 and such that a $\equiv 5^{288}$ mod 140.

3. Page 205, problem 4

   Note: there is a small error in this problem, as e=4 will not work. Please us e = 5 instead.

4. Page 205, problem 7

5. Page 261, problem 3

6. Use the Chinese remainder theorem to find the smallest non-negative solution to x=7 mod 13 and x = 4 mod 15

7. John Smith is a bad student. He tried to use Chinese Remainder theorem with the modulo the values a = 12, b = 14, even though he knows perfectly well that we only proved the Chinese Remainder Theorem for relatively prime values. Show him the error of his ways by giving a pair of values that have (at least) two Chinese Remainders that are the same even though they aren't the same modulo 12 x 14 = 168.

   To be precise, I am asking you to find two integers, say v and w, such that x = v mod 12 and x = w mod 14 have two different solution for x, and these two different solution are not equal mod 168.

8. Compute $(x^3 + x^2 + 1)(x^4 + 2x^2 + 2)$ in $Z_3[x]$

9. Divide $x^3 + x^2 - 5x - 3$ by (x-2) in Q[x].

10. Page 306, problem 50. Show your work, that is show that you get a quotient and remainder that are not unique.