Spring 2015

18.310A Homework 6

Due Wed April 15th at 10AM in lecture

Instructions: Collaboration on homework is permitted, but you must write the solutions yourself; no copying is allowed. Please list the names of your collaborators; if you worked alone, state this. Also indicate any sources you consulted beyond the lecture notes.

1. Let $(f_n)_{n\geq 0}$ be the Fibonacci numbers: $f_0 = f_1 = 1$ and $f_i = f_{i-1} + f_{i-2}$ for $i \geq 2$. Calculate $gcd(f_{2012}, f_{2013})$. Also, find integers s and t such that $gcd(f_{2012}, f_{2013}) = s \cdot f_{2012} + t \cdot f_{2013}$.

2. Find all integer solutions to

$$x \equiv 10 \pmod{15}$$
$$x \equiv 5 \pmod{16}$$
$$x \equiv 7 \pmod{77}$$

3. Calculate (showing your steps) $13^{(23^{33})} \pmod{17}$.