Math 310 Homework 5

Due Tuesday, October 9

23. Show that the equation
$$x^2 - 5y^3 = 12358$$
has no solutions with $x, y \in \mathbb{Z}$, by showing that the equation has no solution in $\mathbb{Z}/5\mathbb{Z}$.

24. By looking at the possible values of x^3 in $\mathbb{Z}/4\mathbb{Z}$, write down three different values of a which are *larger than 1000* for which the equation
$$x^3 - 4y^2 = a$$
has no solutions with $x, y \in \mathbb{Z}$.

25. Find all of the solutions to the equation $x^3 = x$ in
    (a) $\mathbb{Z}/7\mathbb{Z}$
    (b) $\mathbb{Z}/6\mathbb{Z}$

26. (Childs, p.74, E5) Find the congruence class satisfying
$$[313]_{453} * [x]_{453} = [1]_{453}$$

27. (Childs, p.74, E7) Find the solutions to
$$7x \equiv 13 \pmod{215}$$