Number Theory HW Week 4

1. Show that $a^{2}≡b^{2}(n)$ does not imply that $a≡b(n)$.
2. Show that $a≡b(n)$ implies $\left(a,n\right)=(b,n)$.
3. Find the remainder when $41^{65}$ is divided by 7.
4. Show that 39 divides into $53^{103}+103^{53}$.
5. Show an integer is divisible by 2 iff the units digit is 0,2,4,6,8.
6. Show an integer is divisible by 3 iff the sum of the digits is divisible by 3.
7. Show that $a^{2}-a+7 $has units digit of 3, 7, or 9.
8. Solve $6x≡14(21)$.

1,2,5 worth 3 pts

7 worth 4 pts

3,4,6,8 worth 5 pts