

Name: _____

Please show all work.

1. (a) Find a generator for U_7 . (b) Show that U_8 is not cyclic.
2. Partition U_{13} into cosets of the subgroup generated by 3.
3. Let $f: \mathbf{Z}_{15} \rightarrow \mathbf{Z}_{15}$ be the abelian group homomorphism defined by $f(a) = 5a$. What are the kernel and the image of f ? Are they subgroups of \mathbf{Z}_{15} ?
4. Solve the system of congruences $x \equiv 1 \pmod{2}$, $x \equiv 5 \pmod{8}$, $x \equiv 3 \pmod{5}$.
5. Find the gcd of $x^3 - 1$ and $x^2 - 1$. What is the corresponding Bezout relation?

1	2	3	4	5	total (50)	%

Prelim. course grade: %