Name: _____

Please show all work and justify your answers.

1. Find the isomorphism class of $U(12)$ as a finite abelian group.

2. Find all ideals of $\mathbf{Z}_{60}$. Explain why that's all of them. Draw a lattice (i.e. sketch subset relations among the ideals).

3. Prove that $\{\sigma \in S_3 : \sigma(3) = 3\}$ is a subgroup of S_3. Is it abelian? Is it a normal subgroup of S_3? Prove your assertions.

4. Find the quotient and remainder of $x^4 + 3x^3 + 2x^2 + x - 1$ divided by $2x^2 + 1$ in $\mathbf{Z}_7[x]$.

5. Let $A = \{p \in \mathbf{R}[x] : p(0) = 0\}$. Prove that A is an ideal of $\mathbf{R}[x]$. Is A is a prime ideal? Maximal? Explain.

1	2	3	4	5	total (50)	%

Prelim. course grade: %