Midterm 2 / 2004.4.21 / Algebra II / MAT 5313

Name: ______________________________

Please show all work and justify your answers.

1. Characterize all finite subgroups of the multiplicative group $\mathbf{C}\setminus\{0\}$. Prove your assertion.
2. Find the sizes of conjugacy classes for S_4 and verify the class equation.
3. Let $p(x) = x^2 + 3x + 1$, $F = \mathbf{Q}[x]/\langle p\rangle$, and $u = x + \langle p\rangle \in F$. Express u^3 and $(1+u)^{-1}$ as linear combinations of 1 and u.
4. In the above problem find the minimal polynomials of u^3 and $(1+u)^{-1}$ over $\mathbf{Q}$.
5. Find an irreducible polynomial in $\mathbf{Q}[x]$ whose Galois group over $\mathbf{Q}$ is isomorphic to the dihedral group Δ_4. Prove your assertion.

1	2	3	4	5	total (50)	%

Prelim. course grade: %