Homework # 22- Due Thursday 4/27/06, Assigned 4/20/06

0. Read Chapters 9, 10 Vocabulary: nth-root of unity, primitive nth root of unity, solvable by radicals.

1. Recall from class we determined the splitting field of $x^4 - 2$ over $\mathbb{Q}$ was $\mathbb{Q}(\eta, i)$ where $\xi = \sqrt[4]{2}$. Also we calulated the Galois Group was isomorphic to $D_8 =< \sigma, \tau \mid \sigma^4 = \tau^2 = e, \tau\sigma = \sigma^3\tau >$. Let H be the subgroup $\{1, \sigma^3\tau\}$. Show by explicit calculation that the fixed field:

$$\mathbb{Q}(\xi, i)^H = \mathbb{Q}((1-i)\xi)$$

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