Homework 5

1. Find α such that $\mathbb{Q}(\sqrt{2}, \sqrt{5}) = \mathbb{Q}(\alpha)$.

2. Find the minimal polynomial of $\sqrt{2} + \sqrt{5}$ over $\mathbb{Q}$. Determine $[\mathbb{Q}(\sqrt{2} + \sqrt{5}) : \mathbb{Q}]$.

3. Let E be an extension field of F. If $\alpha \in E$ has a minimal polynomial of odd degree over F, then show that $F(\alpha) = F(\alpha^2)$.