1. The hypotheses of the *isomorphism extension theorem* are given below. What is the conclusion of the theorem?

   Theorem: Let $F_1 \subseteq E$ be an algebraic field extension, let $\varphi : F_1 \to F_2$ be an isomorphism of fields, and suppose $\overline{F_2}$ is the algebraic closure of F_2

   there exists an isomorphism from E to a subfield of $\overline{F_2}$ that agrees with φ on elements of F_1

2. Complete the following definitions:

   i. Let F be a field with algebraic closure $\overline{F}$, and let $F \subseteq E \subseteq \overline{F}$ be an extension of F. We say that E is *a splitting field* if:

      there exists a set $X = \{ f_i(x) \mid i \in I \} \subseteq F[x]$ such that E is the smallest field contained in $\overline{F}$ that contains all roots of all polynomials in X.

   ii. Let $F \subseteq E$ be a field extension of finite degree. The *index* of the extension, denoted $\{E : F\}$, is:

      the number of extensions of ("ways to extend" or:) an isomorphism $F \to \overline{F_2}$ to an isomorphism from E to a subfield of $\overline{F_2}$