The number v is called the ramification index of the map f at p; p is called a branch point if $v(p) > 1$. The branch locus of the map f is taken to be either the divisor

$$B = \sum_{p \in S} (v(p) - 1) \cdot p$$

on S or its image

$$B' = \sum_{p \in S} (v(p) - 1) \cdot f(p) \qquad \text{on } S'.$$

For any point $p \in S'$, we can write

$$f^*(p) = \sum_{q \in f^{-1}(p)} v(p) \cdot q,$$

$$\deg f^*(p) = n = \sum_{q \in f^{-1}(p)} v(q),$$

where the summation is over distinct points.
「 We have to count multiplicities. 」

This then gives us a picture of the map f: away from the branch locus of f in S', f is a covering map; at a branch point $p \in S$ of ramification index k, k sheets of the covering come together.

「 Away from the branch locus of f in S', f is locally one to one. $\Rightarrow$ f is a covering map. 」

We can, in terms of the sheet number and ramification of f, relate the genus of S to the genus of S'. Take a triangulation of S' in which every point of the branch locus appears as a vertex.