in homology $f_*([S]) = n \cdot [S']$;
the integer n is called the sheet number, or degree, of the map. For any point $p \in S'$, let Θ be a curvature form for the line bundle $[(p)]$ associated to the divisor (p). Then $f^*\Theta$ is a curvature form for the line bundle $f^*[(p)] = [f^*(p)]$ on S, and we see from the projection in Section 2 of Chapter 1 that

$$\deg f^*(p) = \int_S f^*\left(\frac{i}{2\pi}\Theta\right) = n\int_{S'}\left(\frac{i}{2\pi}\Theta\right) = n$$

so the map f assumes all values $p \in S'$ exactly n times, counting multiplicity in the sense of divisors.

「 See p144. "In the sense of divisors" means that multiplicities are considered. 」

For any $p \in S$, we can find local coordinates z around p in S and w near $f(p)$ in S' such that the map f is given locally by
$$w = z^v.$$

「
$$\begin{array}{ccc} S & \xrightarrow{f} & S' \\ \psi & & \psi \\ p & \longmapsto & f(p) \end{array} \Rightarrow \text{Choose local coordinates } z \,\&\, w \text{ s.t. } \begin{array}{l} p \longmapsto 0 \text{ in the } z \\ f(p) \longmapsto 0 \text{ '' } w. \end{array}$$

$\Rightarrow$ $w = a_1 z + a_2 z^2 + \cdots$ $\Rightarrow$ But since f covers generically, constant number of times, $w = z^v g(z)$ where $g(z) \neq 0$, at $z=0$. By putting $z' = z\, g(z)^{\frac{1}{v}}$, we get $w = z'^{v}$. 」

"Comment: $z' = z\, g(z)^{\frac{1}{v}} \Rightarrow \frac{dz'}{dz} = z\frac{dg}{dz} + g(z)$ is not zero at $z=0$ $\Rightarrow \exists$ an inverse function."