According to P177, $\deg(f(\mathbb{P}^2)) = \deg S = c_1(4H)^2$
since $f^*H = 4H$ and $\dim \mathbb{P}^2 = 2$.
$\Rightarrow \deg S = 4 \cdot 4 = 16$ $\Rightarrow$ This is not true $\Rightarrow$ See P690.
Furthermore, $\sigma_0 s_1 = f^* h_1$, $\sigma_0 s_2 = f^* h_2$, $\sigma_0 s_3 = f^* h_3$,
where h_1, h_2, h_3 are sections of $[H]$ over $\mathbb{P}^3$.
$\Rightarrow f(\{\sigma_0 \cdot s_i = 0\}) = H_i \cap f(\mathbb{P}^2) = H_i \cap S$.
$f(x)$, $x \in \{\sigma \cdot s_i = 0\}$. $\Rightarrow$ $\sigma \cdot s_i(x) = h_i \circ f(x) = 0$
$\Rightarrow$ $f(x) \in H_i$, H_i hyperplane represented by h_i.
$\Rightarrow$ $f(x) \in f(\mathbb{P}^2) \cap H_i$
Conversely, $f(x) \in H_i \Rightarrow h_i \circ f(x) = (\sigma \cdot s_i)(x) = 0$
$\Rightarrow$ $f(x) \in f(\{\sigma \cdot s_i = 0\})$.
$\Rightarrow$ $\{\sigma \cdot s_i = 0\}$ is reducible.
$\Rightarrow$ $f(\{\sigma \cdot s_i = 0\})$ is reducible. for $i = 1, 2, 3$.

Suppose $f(\{\tau = 0\})$ is reducible.
$\Rightarrow$ $f(\{\tau = 0\}) = V_1 \cup V_2 \subset \mathbb{P}^3$.
$\Rightarrow$ Since $f^{-1}(V_1)$ & $f^{-1}(V_2)$ are varieties, and
$f^{-1}(V_1) \cup f^{-1}(V_2) = \{\tau = 0\}$, $\{\tau = 0\}$ is reducible.
Contradiction
$\Rightarrow$ The dimension of reducible hyperplane sections is 2.
* V variety $f: M \longrightarrow N$. $V \subset N$.
$\Rightarrow$ $f^{-1}(V)$ is a subvariety of M.
Let $x \in f^{-1}(V)$. $\Rightarrow f(x) \in V$. $\Rightarrow \exists$ open set U
s.t $f(x) \in U$.

$$U \cap V = \{ g_1 = g_2 = \cdots = g_n = 0 \}$$

$\Rightarrow$ $f^{-1}(U \cap V) = f^{-1}(U) \cap f^{-1}(V) = \{ g_1 \circ f = \cdots = g_n \circ f = 0 \}$.