1. Let $S$ be a smooth surface and let $P$ be a plane that intersect $S$ in a curve $\gamma$. Show that if $S$ is symmetric with respect to $P$, then $\gamma$ is a geodesic (Hint: use the uniqueness of geodesics).

2. Let $\gamma(t)$ be a unit speed curve in $\mathbb{R}^3$, defined for $t \in I$, with nowhere vanishing curvature. Consider the surface patch $\sigma(u, v) = \gamma(u) + vB(u)$, where $B$ is the binormal vector, $u \in I$ and $v \in (-\epsilon, \epsilon)$. Fact: If $\epsilon$ is small enough then $\sigma$ parametrize a regular surface. Prove that $\gamma$ is a geodesic in $S$. 