Problem (Problem 5)**:** A smooth map $f\colon M \to n$ is called a submersion if it induces surjections on tangent spaces. Prove that if M and N are smooth manifolds and $A \subseteq N$ is a smooth submanifold, then f is transverse to A.

Solution: Let $p \in f^{-1}(A)$. By the definition of the submersion, we have $T_{F(p)}N = D_pF\big(T_pM\big)$, meaning that $D_pF\big(T_pM\big) + T_{F(p)}A = T_{F(p)}N$.