Proof. Let C_n be the crossing point of two normals n_1 and n_2.

Then, $\sum_i (q_i - C_n) \cdot p_i = 0$,
$(q_1 - C_n) \cdot p_1 = 0$ and
$(q_2 - C_n) \cdot p_2 = 0$.
$\therefore (q_3 - C_n) \cdot p_3 = 0$. $\square$