

Q1) Let $u = (u_1, u_2)$ and $v = (v_1, v_2)$ be the vectors in R^2 . Verify that the weighted Euclidean inner product $\langle u, v \rangle = 3u_1v_1 + 2u_2v_2$ satisfies the four inner product axioms.

Q2) Let $p = x$, $q = x^2$ and inner product is defined as $\langle p, q \rangle = \int_{-1}^1 p(x)q(x)dx$.

Find $\|p\|$ and determine whether p and q are orthogonal or not.