

MATH 4242 Quiz 4

Name: _____
Student Id: _____

Let $V = \mathbb{R}^3$ with orthonormal basis e_1, e_2, e_3 (the standard basis). The inner product is taken to be the usual dot product.

Let $W = \{(x, y, 0) | x, y \in \mathbb{R}\}$ be the subspace of V . Compute the orthogonal projection of $v = (1, 2, -1)$ onto W .

Proof. Since $W = \text{span}(e_1, e_2)$, we know that e_1, e_2 form an orthonormal basis of W . Thus $\text{Proj}_W v = \langle v, e_1 \rangle e_1 + \langle v, e_2 \rangle e_2 = 1(1, 0, 0) + 2(0, 1, 0) = (1, 2, 0)$.

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