Math 411 Spring 2016 Homework #12

Due May 3, Tue in class

1. Textbook, 6.C, page 201: 12 (*Hint*: construct an orthonormal basis for the subspace of $\mathcal{P}_3(\mathbb{R})$ that the polynomial $2 + 3x$ is projected onto, and then use orthogonal projection);

2. Textbook, 7.A, page 214: 1, 2, 4(a);

3. Let V be an inner product space.

   (1) Let $\{v_1, \ldots, v_k\}$ be a basis of the subspace M of V. Show that a vector $x \in V$ is orthogonal to M if and only if x is orthogonal to each v_i, $i = 1, \ldots, k$;

   (2) Let $P_M : V \to M$ denote the orthogonal projection operator onto the subspace M. Show that the null space of P_M is $M^\perp$.

More practice problems: *Do not submit*

1. Textbook, 6.C, page 201: 1, 8;

2. Textbook, 7.A, page 214: 5, 6.