Math 411 Spring 2016 Homework #11

Due April 26, Tue in class

1. Textbook, 6.A, page 175: 4(a), 8, 19;
2. Textbook, 6.B, page 190: 5, 7 (you may use the orthonormal basis of $\mathcal{P}_2(\mathbf{R})$ found in Problem 5);
3. Let $\{v_1, \ldots, v_k\}$ be an orthonormal set in the inner product space $(V, \langle \cdot, \cdot \rangle)$, and $x \in V$, where V need *not* be of finite dimension.
   (1) Show that if $x \in \text{span}(v_1, \ldots, v_k)$, then $\|x\|^2 = |\langle x, v_1 \rangle|^2 + \cdots + |\langle x, v_k \rangle|^2$;
   (2) Show that if $x \notin \text{span}(v_1, \ldots, v_k)$, then $\|x\|^2 > |\langle x, v_1 \rangle|^2 + \cdots + |\langle x, v_k \rangle|^2$.

More practice problems: *Do not submit*

1. Textbook, 6.A, page 175: 6;
2. Textbook, 6.B, page 190: 9, 13.