UM102 – Analysis and Linear Algebra II
2019 Spring Semester

[You are expected to write proofs / arguments with details of your reasoning, in solving these questions.]

Homework Set 3 (*Quiz on Monday, January 28*, in Tutorial Session)

Question 1. Suppose S is a finite-dimensional subspace in a real inner product space V. We saw in class that the projection map $P_S : V \to V$ has image in S and is a linear transformation.

Prove that $(P_S)^k = P_S$ for all integers $k \geq 1$, where $(P_S)^k = P_S \circ P_S \circ \cdots \circ P_S$ is the composition of linear operators.

From the textbook *Calculus, Vol. II* by Tom M. Apostol (2nd edition):

Section 1.17 (Exercises section), on page 30:
Problems 2, 6, 8.