Math 113: Linear Algebra and Matrix Theory

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Homework 8

Due Wednesday, November 18 in class.

Do all the following exercises and questions.

7A.11	**7A.12**	**7A.16**
7B.1	**7B.2**	**7B.7**

Question 1.

(a) Give an example of two self-adjoint operators $S \in \mathcal{L}(\mathbb{R}^2)$ and $T \in \mathcal{L}(\mathbb{R}^2)$ whose product ST is not self-adjoint.

Let V be a finite-dimensional inner product space, and assume that $S \in \mathcal{L}(V)$ and $T \in \mathcal{L}(V)$ are self-adjoint.

(b) Prove that $ST + TS$ is a self-adjoint operator.

(c) Prove that ST is self-adjoint if and only if $ST = TS$.