Math 416 Homework 5

Problem 1. In Section 2.1 of [FIS], do Problem 2.

Problem 2. In Section 2.1 of [FIS], do Problem 5.

Problem 3. In Section 2.1 of [FIS], do Problem 10.

Problem 4. In Section 2.1 of [FIS], do Problem 13.

Problem 5. In Section 2.1 of [FIS], do Problem 17.

Problem 6. In Section 2.2 of [FIS], do Problem 2 parts a, b, g.

Problem 7. In Section 2.2 of [FIS], do Problem 3.

Problem 8. In Section 2.2 of [FIS], do Problem 4.

Problem 9. We define the linear transformation $T_\theta : \mathbb{R}^2 \to \mathbb{R}^2$ to be rotation counter-clockwise about the origin through angle $\theta$. Let $T_x$ be the transformation that reflects in the $x$-axis.

1. Write down the matrices of $T_\theta$ and $T_x$ with the respect to the standard basis $\beta = \{e_1, e_2\}$ for $\mathbb{R}^2$.

2. Show that for $\theta \in (0, \pi) \cup (\pi, 2\pi)$ one has $T_x \circ T_\theta \neq T_\theta \circ T_x$.

3. Next, show that there is some angle $\psi$ such that $T_x \circ T_\psi = T_\theta \circ T_x$.

What is the relationship between $\theta$ and $\psi$? Discuss the geometric meaning of this computation.

Problem 10. Not to be turned in: in Section 2.1 of [FIS], do Problem 1.

Problem 11. Not to be turned in: in Section 2.1 of [FIS], do Problem 9.


Problem 13. Optional: in Section 2.2 of [FIS], do Problem 16.