1 2.3

1. Recall the weird bracket thing.
2. The space of all linear transformation from V to W is a vector space. It is a subspace of $F(V, W)$. It is denoted $L(V, W)$. What is its dimension? What is a basis for it?
3. Left-shift and right-shift operations.
4. The A_{ij} notation is a thing.
5. Let A be a $m \times n$ matrix and B be a $n \times p$ matrix. Then the product is the $m \times p$ matrix given by

   $$(AB)_{ij} = \sum_{k=1}^{n} A_{ik} B_{kj}$$

   for $1 \leq i \leq m$ and $1 \leq j \leq p$.
6. Matrix multiplication corresponds to linear map composition. See Tao's notes pg 99 and 100
7. Given a matrix A, we can define the left multiplication transformation. Give an example.
8. Give properties. Show associativity proof. See 93 in FIS.

2 2.4

1. Isomorphism allow us to say that 2 spaces are essentially the same.
2. For example, x-axis and R.
3. Let V and W be vector spaces. Then a linear transformation is invertible if it has a 2-sided inverse.
4. Theorem: Inverses are unique.
5. Theorem: $(TU)^{-1} = U^{-1}T^{-1}$.
6. Inverses are invertible.
7. Bubbles. Rank is dimension of domain.