

Math 7820, Fall 2022

Homework, due on Thursday, September 15.

The first three problems refer to Loring Tu's textbook. **In each of these three problems, please specify what definition of the tangent space you are using.**

1. Problem 8.2.

2. Problem 8.7.

3. Problem 8.8.

4. Prove that

$$T_p^1 M \subset T_p^2 M,$$

where the notation refers to Definitions 1 and 2 of the tangent space discussed in class. (In class we showed the opposite inclusion, so combined with this problem this shows that the two definitions are equivalent.)