

Problems are typically taken from either Jeffrey Lee's text *Manifolds and Differential Geometry* (MDG) or John Lee's text *Smooth Manifolds* (SM). I've also written a few problems. Most problems 5pts here.

- Problem 73** SM Exercise 19-9 page 495. (local coframe criterion, if you can get part of it good, if all great)
- Problem 74** SM Exercise 19-10 page 495. (this problem is ideal)
- Problem 75** SM Exercise 19-15 page 499. (flows and integral submanifold verification)
- Problem 76** SM Problem 19-2 page 512. (involutivity in view of calculus and algebra of forms)
- Problem 77** SM Problem 19-3 page 512. (integrating factor, Pfaff's Theorem)
- Problem 78** SM Problem 19-4 page 512. (find a flat chart, I hope this isn't too tricky)
- Problem 79** SM Problem 19-5 page 513. (find integral submanifold)
- Problem 80** Let G be a Lie group and suppose $\mathfrak{h} \leq \mathfrak{g}$. Explain how the Lie subalgebra \mathfrak{h} can be used to define an involutive distribution on G .
- Problem 81** Give five example homogeneous spaces from Chapter 21 of John Lee's text.