

1. For  $X \in \mathfrak{X}(M)$ , Cartan's formula relates Lie derivative with exterior and interior derivatives:

$$\mathcal{L}_X = \iota_X \circ d + d \circ \iota_X$$

Prove this is true on  $\wedge^1(M)$ , i.e. prove

$$\mathcal{L}_X \theta = (\iota_X \circ d + d \circ \iota_X) \theta$$

for a one-form  $\theta$ .

- Lee Chapter 9 Problem 1
- Lee Chapter 1 Exercise 1.127
- Don't write this one down, but think a little bit about Lee Exercise 1.128.