Math 534A Homework 5.
Due 10/7

1.* Suppose $F : M \to N$ is a smooth map. Recall the definitions $T^\text{path}_p M$ and $T^\text{der}_p M$, and denote the associated push forwards as $F^\text{path}_p$ and $F^\text{der}_p$. Show that the following diagram is commutative:

\[
\begin{array}{ccc}
T^\text{path}_p M & \xrightarrow{F^\text{path}_p} & T^\text{path}_{F(p)} N \\
\downarrow & & \downarrow \\
T^\text{der}_p M & \xrightarrow{F^\text{der}_p} & T^\text{der}_{F(p)} N 
\end{array}
\]

2. Prove proposition 3.8 (there is a proof, so just give a proof in your own words)

3. Lee 3-1.

4. Lee 3-2

Note: * means that I want someone to look at your answer and attest to it before submitting.