S1. For the diffeomorphism $F : T^1 \to T^1$ given in the Example of the Lecture #10, compute $F_*((1/\sqrt{2}, 1/\sqrt{2}), v)$.

S2. Give a proof of Lemma 1.187. (See the hint given on p.100).

S3. (1) For $\Lambda \in L(X,Y)$, prove that $\|\Lambda x\| \leq \|\Lambda\| \|x\|$ for all $x \in X$. (2) Prove properties (i) and (v) of the derivative listed on the last two pages of Lecture #19.

S4. For $X = C[0,1]$, prove that $F : X \to X$ defined by $F(g(t)) = \cos(g(t))$ belongs to $C^1(X,X)$, and find its derivative.

S5. Prove that a continuous differentiable function $f : [0,1] \to [0,1]$ is a contraction if $|f'(x)| < 1$ for all $x \in [0,1]$.

S6. Give a proof, different from the one in the text, of the Lemma in Lecture #31.

S7. Give a proof of Equation (1) in Lecture #32.