1. If $T : X \to X$ is $I + F$ where I is identity and F is an operatorof finite rank, show that its index is 0 by explicit calculation.

2. Let $H = \{f : f = \sum_{k=0}^{\infty} a_k e^{ikx}\}$ where $\sum_{k=1}^{\infty} |a_k|^2 < \infty$. $H \subset L_2[S]$ with $S = \{z : |z| = 1\}$. $P : L_2(S) \to H$ is the orthogonal projection onto H. If $f(s)$ is a continuous function $S \to C$ with $f(s) \neq 0$ for any $s \in S$ then show that $g \to P\frac{1}{f}Pfg$ is fedholm nad calculate its index. The map $T_f : H \to H$ is mutiplication of $g \in H$, i.e. a function with nonengative Fourier coefficients by a smooth function f projecting out the negative frequencies, mutiplying by $\frac{1}{f}$ and projecting out again the negative frequencies.