Problem 1. Consider the Hopf map $\eta: S^3 \to S^2$.

a. Describe the cofiber $C(\eta)$. It is a familiar space.

b. Consider the canonical comparison map $\varphi: F(\eta) \to \Omega C(\eta)$ from the homotopy fiber to the loop space of the cofiber. Find the lowest dimension $k$ such that $\pi_k F(\eta)$ is not isomorphic to $\pi_k \Omega C(\eta)$ (and thus $\varphi$ cannot possibly induce an isomorphism on $\pi_k$).

Remark. It turns out that $\varphi$ induces an isomorphism on homotopy groups $\pi_i$ for $i < k$, but you are not asked to show this.