Problem 1: Find $f'(x)$ for each of the following functions and simplify your answers.

(a) $f(x) = \tan^4 x$.

(b) $f(x) = \ln \sqrt{\cos x}$.

(c) $f(x) = \csc(1 - 5x^2)$.

Problem 2: Evaluate the following integrals:

(a) $\int \frac{\cos x}{1 + \sin x} dx$

(b) $\int \tan^4 \sec^2 x dx$
(a) \[ \int \frac{\sin x \, dx}{(1 + \cos x)^2} \]

(b) \[ \int \sqrt{\cot x \csc^2 x} \, dx \]