(1) (10 points) Consider the function \( f(x) = \sin^{-1} \left( \frac{1}{\sqrt{x^2 + 1}} \right) - \tan^{-1} \left( \frac{1}{x} \right) \). Find \( f'(x) \) and simplify your answer completely.

(2) (10 points) Find a linearization of \( f(x) = \sqrt{x} + \ln x \) at \( x = 1 \) and use it to approximate \( f(1.1) \).

(3) (20 points) Highway patrol. A highway patrol plane flies 3 mi above a level, straight road at a steady speed of 120 mi/h. The pilot sees an oncoming car and with radar determines that at the instant the line-of-sight distance from plane to car is 5 mi, the line of sight distance is decreasing at a rate of 160 mi/h. Find the car’s along the highway.